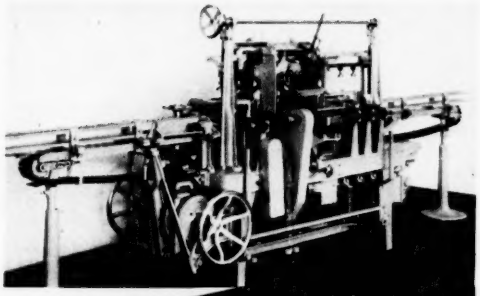
NATIONAL EDITION

Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication

As many as 1,500 girls work on trimming and packing tables in Hawaiian Pineapple plant at peak of season. (See story inside)

JANUARY, 1949: Advanced methods in cannery, Variable speed solves plant problems, Automatic proportioning, Picture flowsheet, Outlook

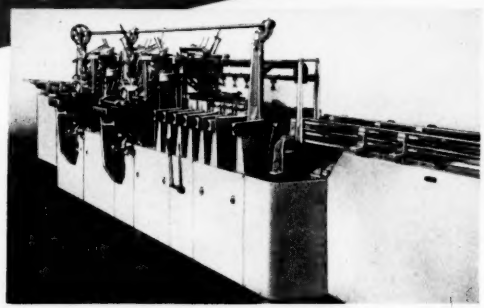


The Model 65 BEE-LINE applies labels up to 7 inches high and 5¼ inches wide to containers up to 13 inches high. Variable speed drive provides for 30 to 65 labeled containers per minute.

WORLD LABELERS

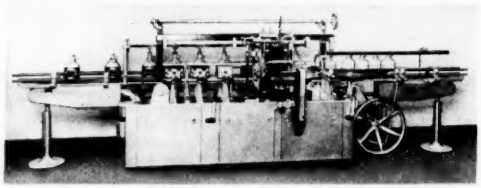
BEE-LINE

QUALITY · PRODUCTION · ECONOMY



The Model 120 BEE-LINE equipped with twin labeling station provides any desired production from 60 to 120 containers per minute, handles same range of sizes as the Model 65.

The WORLD *BEE-LINE* Labeler conducts your glass containers, however light or delicate, straight down a bee-line without traffic jams, detours or collisions. Gently they are dressed up and ready to go out in public and do you proud, with body labels, front or front-and-back, and neck labels if desired, precisely, firmly and smoothly applied to a wide range of container sizes and shapes.



The Model 40 BEE-LINE handles gallon and half-gallon and smaller bottles, jugs or jars, labels up to 8"x7", containers up to 8" diameter.

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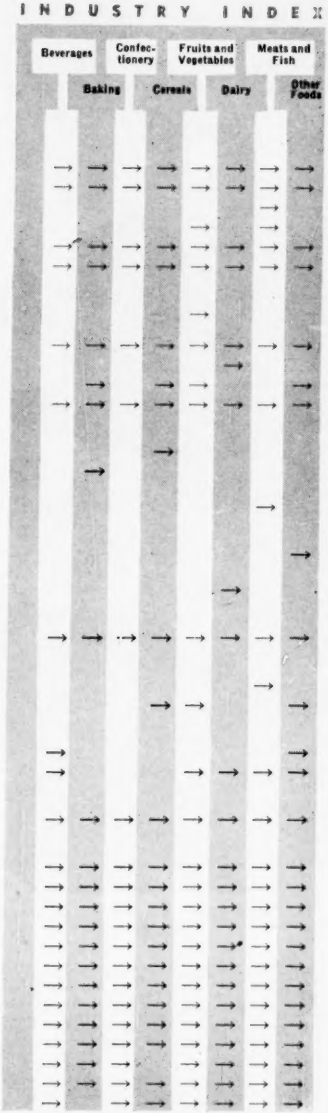

Food Industries

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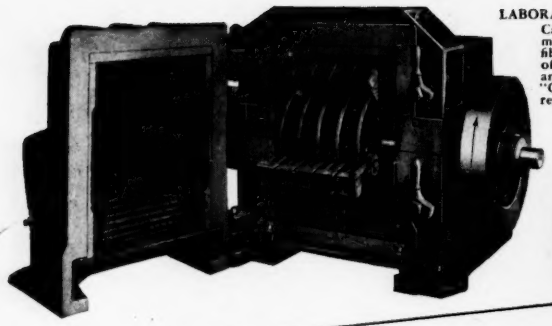

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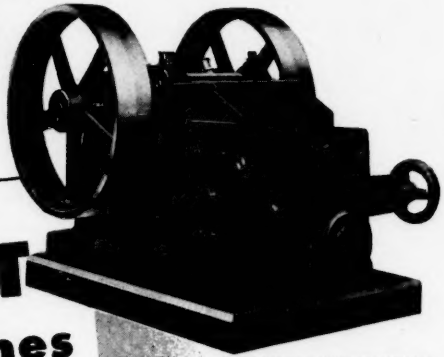

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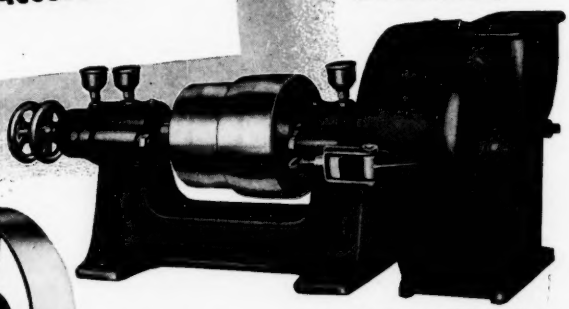

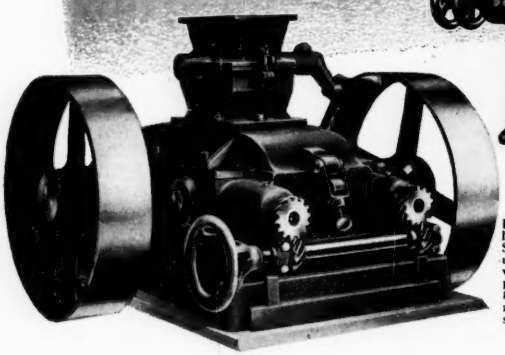

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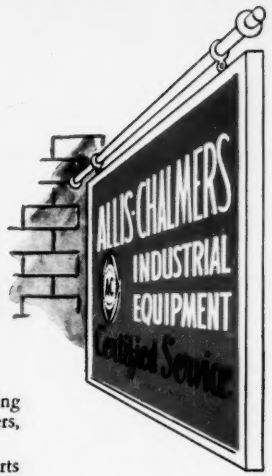

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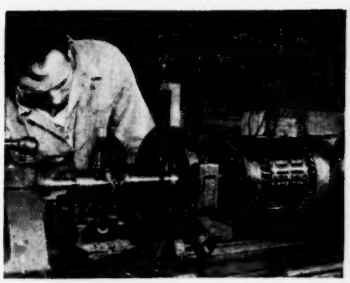

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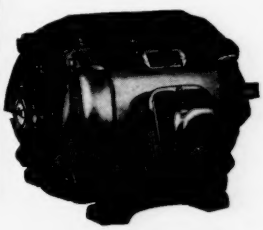

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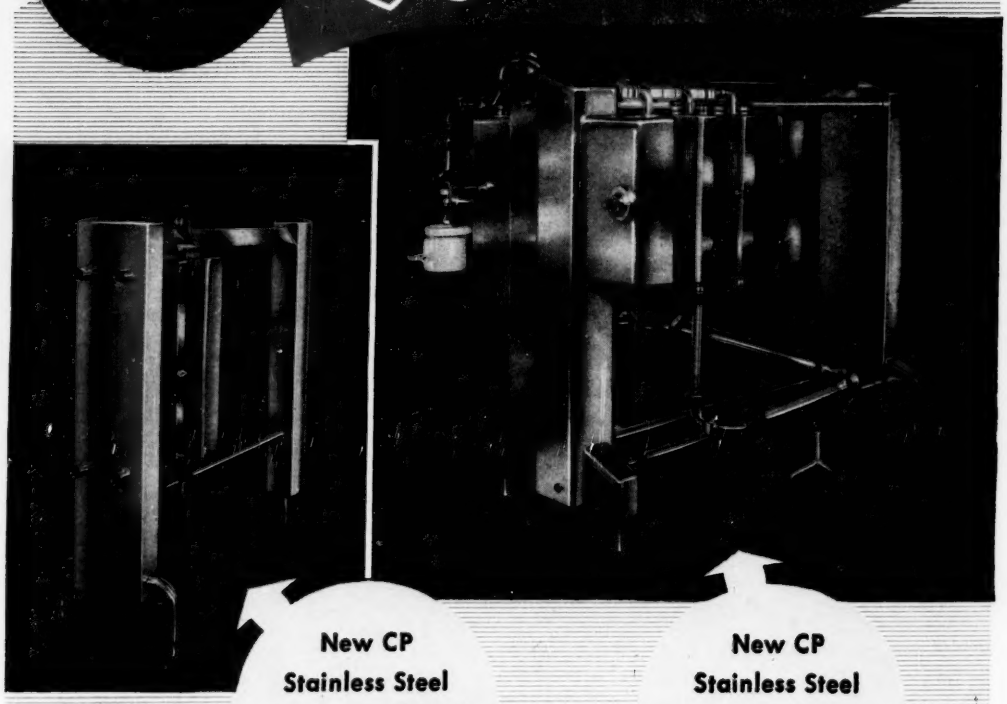

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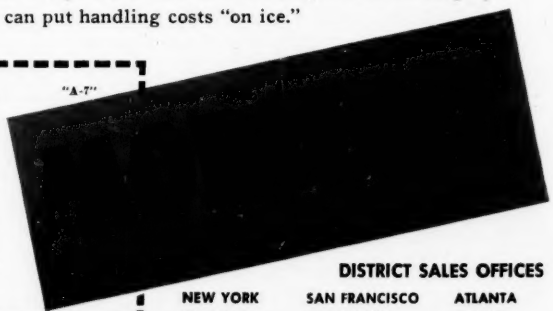

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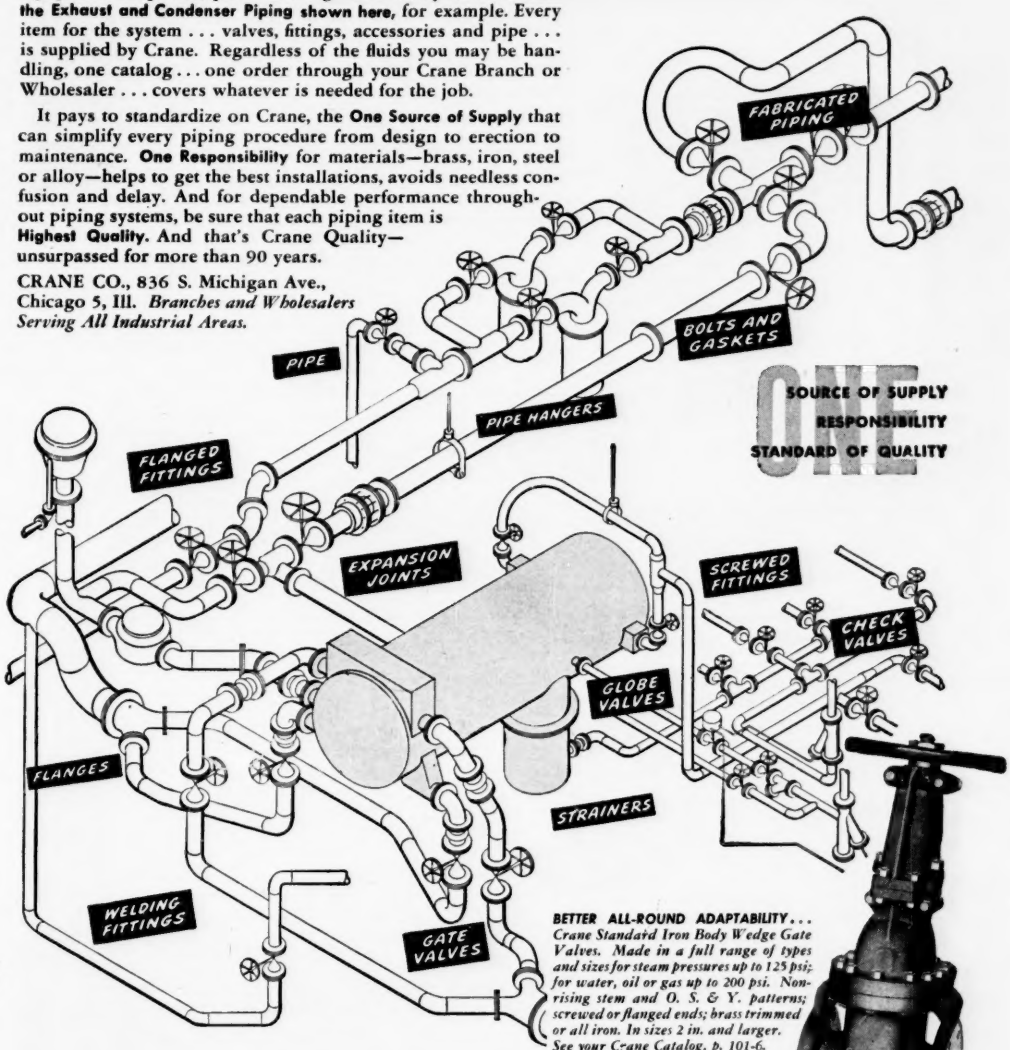

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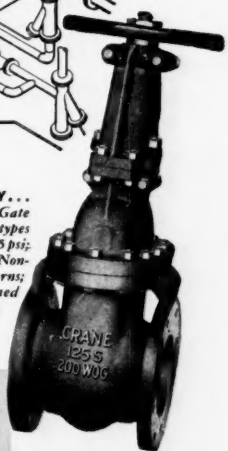

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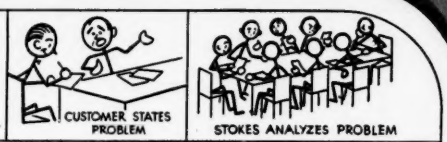

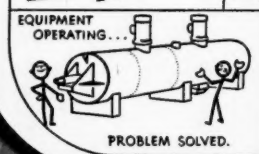

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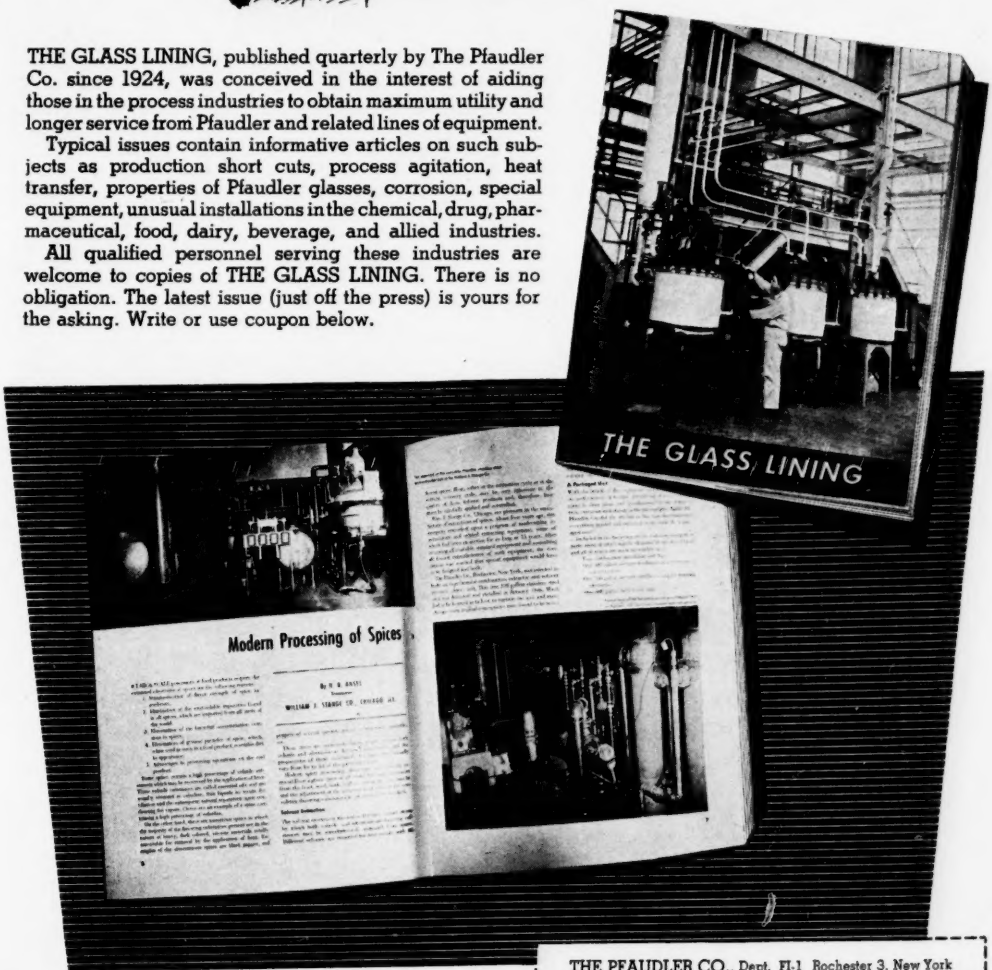

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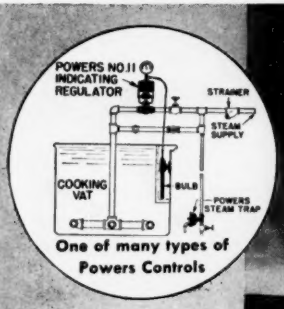

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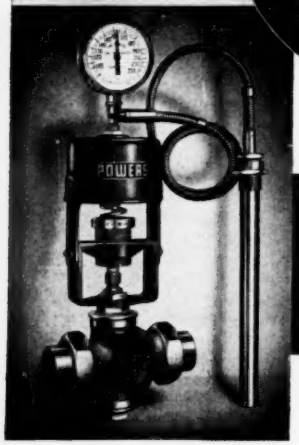
•

Large Easy-to-Read Dial Thermometer Indicates temperature of process being controlled by POWERS No. 11 Indicating Regulator shown below.



Also
WATER HEATERS
HOT WATER LINE CONTROL
WASHING • STERLIZING
POULTRY PROCESSING
EQUIPMENT *and*
many other uses

Use
POWERS NO. 11 REGULATORS

SIMPLIFY your temperature control problems by standardizing on POWERS regulators. Use them wherever you want to maintain a constant temperature with year after year dependability of operation. Often give 10 to 25 years of service, and pay back their cost several times a year. Phone or write our nearest office for estimate or get a copy of New Catalog 329. (49MP)

THE POWERS REGULATOR CO.

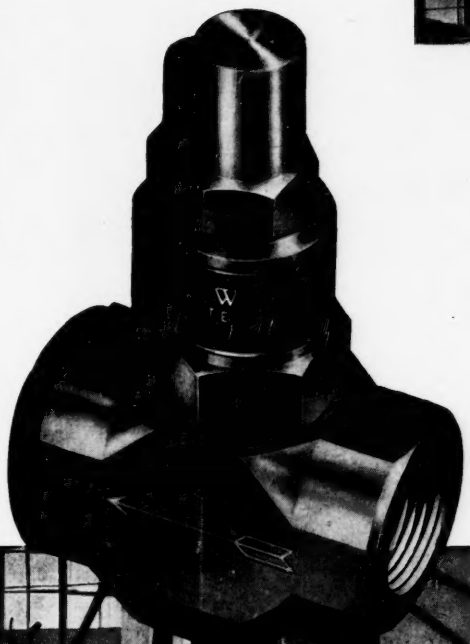
OFFICES
IN 50 CITIES

Over 55 Years of Temperature and Humidity Control

CHICAGO 14, ILL., 2720 Greenview Ave. • NEW YORK 17, N. Y., 231 East 46th St.
LOS ANGELES 5, CAL., 1808 West 8th St. • TORONTO, ONT., 195 Spadina Ave.

YARWAYS make it hot for "CHILI"

Marlo Packing Corporation, San Francisco, specialize in making delicious chili con carne... and they rely on Yarway Impulse Steam Traps on cooking kettles to get that chili hot!



Getting equipment hotter, sooner—and keeping it hot—is the job Yarway Impulse Traps specialize in wherever steam traps are used.

When steam is turned on, Yarways open wide and discharge condensate continuously so that operating temperature is quickly reached. Then, under lighter condensate loads, Yarways discharge at short intervals to *keep* equipment at peak efficiency. Other Yarway features—small size, easy installation, straight through piping, low maintenance, only one moving part, low price.

Call your nearest Mill Supply dealer for Yarway Impulse Steam Traps and Yarway Strainers today.

FREE TRAP BULLETIN T-1739 ON REQUEST

YARNALL-WARING COMPANY

127 Mermaid Ave., Philadelphia 18, Pa.

Yarway Traps and Strainers on cooking kettles at Marlo Packing Corp.

YARWAY IMPULSE STEAM TRAP

Snow *Tonight* Clear *Tomorrow*

Snow Tonight—Clear Tomorrow is much more than a weather forecast. It's an ideal slogan for the thousands of rugged GMC trucks that work while we sleep to keep the highways open for safe, speedy travel.

GMC extra value shows up best when working conditions are at their worst . . . because chassis are truck-designed and truck-engineered from radiator to rear axle . . . because power plants have the same basic design and features as those of the durable and dependable GMC "Army Workhorse" engine.

Whether your hauling job calls for "tough going" or "smooth sailing" . . . the extra stamina built into every GMC means extra miles of dependable, economical operation.

THE TRUCK OF VALUE

GMC TRUCKS

GASOLINE • DIESEL

GMCs are available in light, medium and heavy duty models . . . in a range of seven gasoline and two Diesel engines . . . and with chassis and equipment options that permit truck and tractor types exactly suited to every food hauling job.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

How to help a bread slicer *carve a name for itself*

Here's how BATTLE CREEK BREAD WRAPPING MACHINE CO. uses Timken bearings on the knife drum shafts of the Model 75 Continuous Flow Band Slicer. Two drums are used, each with two Timken bearings—an assurance of long and trouble-free service.

CLEAN-CUT, accurate slicing of 75 loaves a minute, instantaneous thickness control and minimum maintenance expense are winning a top-flight reputation for this modern, streamlined bread-slicing machine. Important factors in its smooth, dependable, high speed operation are the Timken® bearings used by the Battle Creek Bread Wrapping Machine Company on the knife drum shafts.

Because of their tapered roller design, Timken bearings keep moving parts in perfect alignment—permanently. They carry both radial and thrust loads in any combination. The line contact between rolls and races gives tremendous load-carrying capacity. Wear is negligible, even after exceptionally long periods of service.

Timken bearings normally last the life of the machine. Due to their free rolling motion and incredibly smooth surface finish, friction is almost eliminated. And because Timken bearings permit effective closures, lubricant cannot leak out to contaminate foods.

On any machine, Timken bearings add a valuable sales feature. They assure greater acceptance among customers. Specify "Timken" for the new machines you buy; and always look for the trade-mark "Timken" on the bearings you use in the machines you build. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN BEARING CAPACITY RATINGS INCREASED 25%.

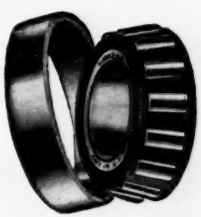
Since Timken bearings were last re-rated some 15 years ago there has been such a further and constant improvement in quality that we are now able to announce a 25% increase in radial and thrust load carrying capacity. This may make possible the use of smaller bearings with savings in bearing cost, material cost and weight. Engineers will be able to utilize the advantages of Timken bearings in more applications than in the past.

A new Timken Engineering Journal, now in preparation, will give you complete capacity rating tabulations. For further assistance, write us today.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂ THE TIMKEN TAPERED ROLLER ⊂ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION →◎←

KVP

papers provide

PROTECTION and Beauty

for all kinds of FOOD PRODUCTS

Industries Served

DAIRY
Butter
Cream
Cheese
Ice Cream
Milk

BAKING
Bread
Cracker
Cereal

FISH

FRUIT

FROZEN FOODS

MEAT
Packing
Locker
Retail

POULTRY

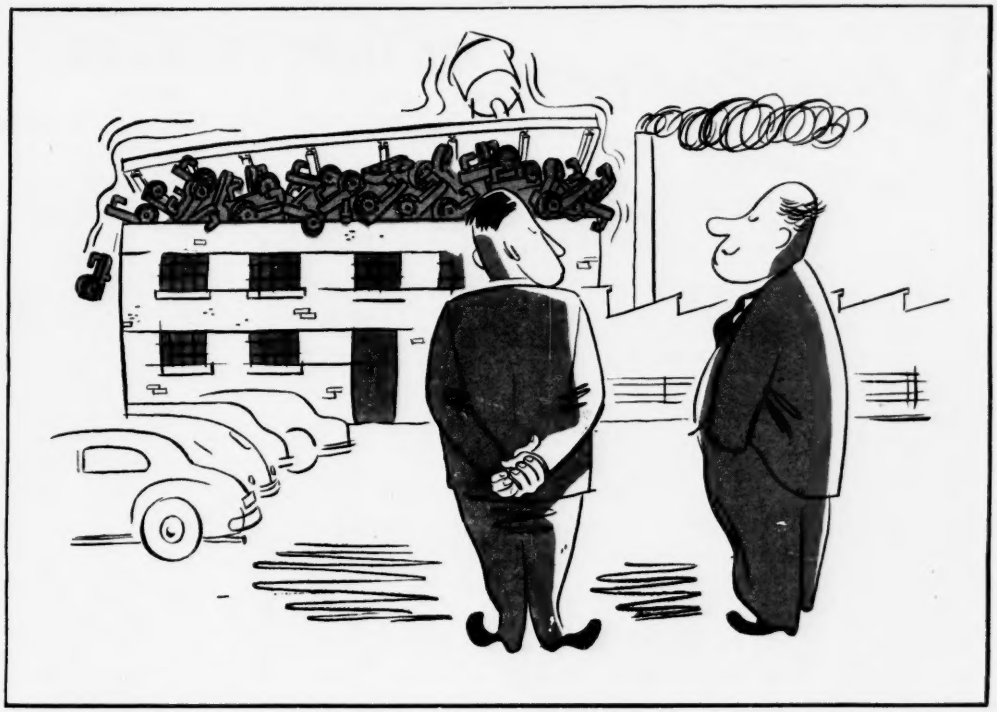
SHORTENING

VEGETABLE

Kalamazoo Vegetable Parchment Company

PARCHMENT · MICHIGAN

ASSOCIATED COMPANIES: KALAMAZOO VEGETABLE PARCHMENT CO., DEVON, PENNA.
KVP COMPANY OF TEXAS, HOUSTON, TEXAS
HARVEY PAPER PRODUCTS CO., STURGIS, MICHIGAN
IN CANADA: KVP COMPANY LIMITED, ESPANOLA, ONTARIO
APPLEFORD PAPER PRODUCTS LIMITED, HAMILTON, ONTARIO · MONTREAL, QUEBEC

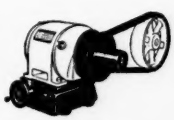


"Didn't I tell you **Reeves Speed Control** would raise our production ceiling?"

THE 3 BASIC REEVES UNITS

VARIABLE SPEED TRANSMISSION for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Sizes—fractional to 87 hp.

VARI-SPEED MOTOR PULLEY provides an instantly variable speed drive within 4:1 ratio for any constant speed motor. Sizes to 15 hp.



MOTODRIVE combines motor, speed varying mechanism and reduction gears in single unit. Speed variations 2:1 to 6:1 inclusive. Sizes to 20 hp.

● REEVES-equipped machines turn out more work and do more different jobs—more accurately and economically—because instant, infinitely variable REEVES Speed Control provides the right speed for every operation and every operator, under every changing condition. Specify REEVES Variable Speed Drives for your new machines—apply them to machines now in service. Let an experienced REEVES Speed Control engineer assist you in choosing the proper units for your operation from the complete REEVES line, including a wide range of designs, sizes and speed ratios—with manual, push-button or automatic control. Write for the 114-page catalog, No. FD2-450A.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

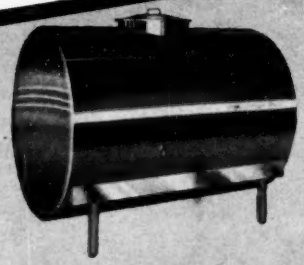
Recognized Leader in the Specialized Field of Speed Control Engineering

ACCURATE • VARIABLE

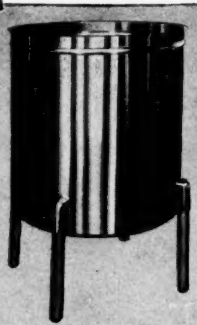
Reeves Speed Control

GIVES THE RIGHT SPEED FOR EVERY JOB!

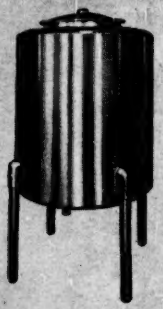
All the Requirements FOR LIQUID PROCESSING



TYPE "H." A mixing or storage tank recommended for low headroom installations.



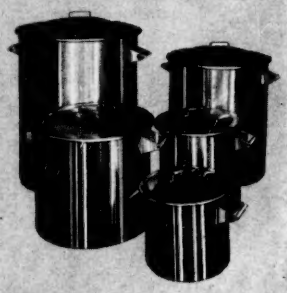
TYPE "J." A modern design open-top San-I-Tank.



TYPE "K." Closed top tank for mixing or storage.

TYPE "L." Large capacity and low sides for shoulder height operation.

TYPE HALF ROUND. An ideal storage vat for processing liquids or foods.



STOCK POTS. Sturdy, stainless steel utility pots.

are in STAINLESS STEEL SAN-I-TANKS

- A COMPLETE LINE
- STREAMLINED DESIGN
- PRACTICAL CONSTRUCTION
- EASY OPERATING
- SELF DRAINING
- LOW COST

Send today for your free copy of Bulletin SS-48. Contains full information, specifications and data on Single Shell SAN-I-TANKS.

Thousands of industries throughout the world are using SAN-I-TANKS to meet their liquid processing requirements. Whether the operation is mixing, blending or storage . . . in tank capacities from five to 5,000 gallons . . . there's a SAN-I-TANK to handle the job.

Experience gained through many years in the tank fabricating industry has resulted in a complete line of modern SAN-I-TANKS. Durable, stainless steel construction assures long-term service and top operating efficiency that meets every sanitary requirements.

SAN-I-TANKS also feature a full line of accessories including motor-driven agitators, sanitary flush valves, faucets and covers.

For liquid processing equipment that meets your exact requirements check with SAN-I-TANK first!

STAINLESS STEEL SAN-I-TANKS

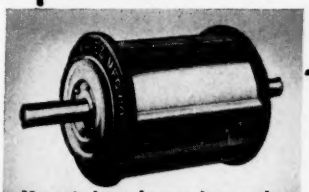
SERVING THESE INDUSTRIES: BEVERAGE • MILK • FOOD • DRUGS • CHEMICALS • COSMETICS

METAL GLASS PRODUCTS COMPANY

GENERAL OFFICES BELDING 2, MICHIGAN

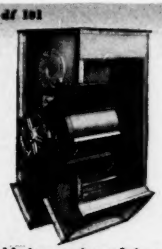
Now! a permanent non-electric magnetic drum separator

Developed by *Eriez*



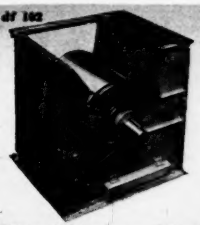
Magnetic drum element above can be ordered separately. Shaft diameters are standard to permit replacement in existing installations without changing bearing or shaft mountings. Ordinarily installed at discharge end of gravity flow chutes, spouts, or other conveyors.

TYPE df 101



Available in a variety of sizes, 12", 18" and 24" diameters. Utilizes a reverse feed which eliminates glancing. Adjustable check gate regulates and evenly feeds material. Shell rotates on chrome-steel precision ball bearings, completely sealed in a dust proof mounting. Unit is fully enclosed, fully automatic and of all metal construction.

TYPE df 102



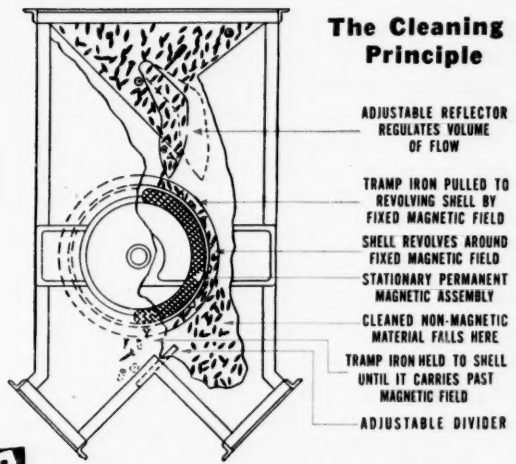
Available in 12" diameter x 14" width. Adaptable for majority of installations. Bearings are same as df 101 drum. Adjustable check gate regulates and evenly feeds material. Drum and housing are furnished ready for installation. Unit is fully enclosed, fully automatic and of all metal construction.

AFTER two years of field testing in every industry, Eriez offers industry this completely new, revolutionary magnetic drum type separator. Self-cleaning, and powered by permanent non-electric magnets, the Eriez separates ferrous materials at far lower cost. There's no operating or maintenance expense . . . no need for current or wiring . . . you get safe, spark-proof reliable magnetic protection right around the clock. There's nothing to get out of order—no attendant electrical accessories . . . the powerful magnetic field of the Eriez is Permanent and magnetic separation is amazingly simple. A look at the diagram below shows how it's done.

AUTOMATIC FERROUS METAL SEPARATION FOR:

Powders	Sand	Minerals
Chemicals	Tobacco	Fertilizers
Grain	Explosives	Metals
Plastics	Crumb Rubber	Textiles

The Cleaning Principle



Pioneer of **PERMANENT** Magnetic Separation

SEE OUR CATALOGUE SWEET'S

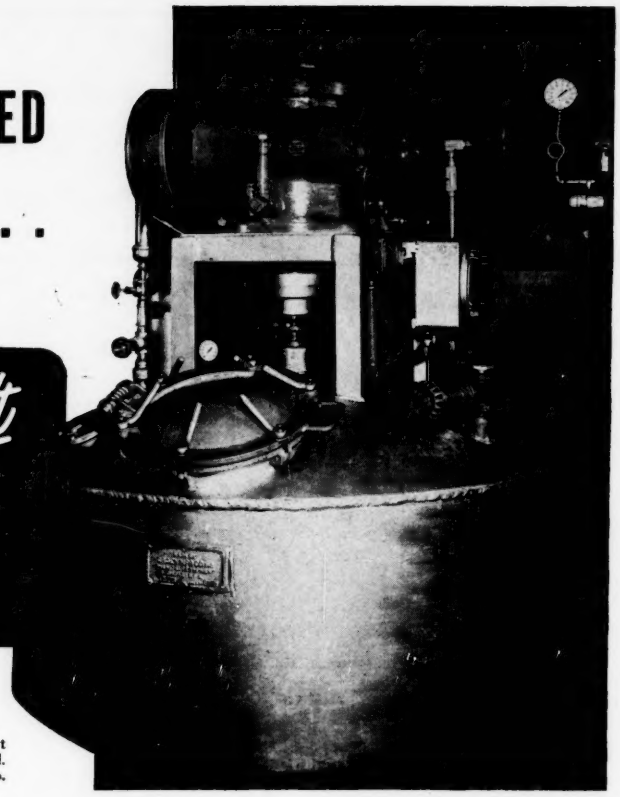
Free A new 4 page Bulletin on Magnetic Drums. Write for it today.

ERIEZ MANUFACTURING COMPANY

101 East 12th St. • ERIE, PA.

ABBOTT SPECIFIED MONEL-CLAD . . . .

because it doesn't do something



Monel-Clad Steel malt syrup mixing tank at Abbott Laboratories, North Chicago, Ill. Fabricated by Groen Mfg. Co., of Chicago.

Monel has no effect on the vitamins contained in the malt syrup handled in this tank. That's why Lukens 10% Monel-Clad Steel was used here; to safeguard the potency of products produced by Abbott Laboratories.

Other industries specify Lukens Clad Steels for a similar reason. These corrosion-resistant surfaces preserve beer's fine flavor, color and clarity.

Lukens Clad Steels present a corrosion-resistant surface of nickel, stainless steel, Inconel or Monel to protect materials coming in contact with it and to lengthen the life of the equipment itself. A uniform cladding, 10% or 20% of total plate thickness, is permanently bonded to a steel backing plate, providing *solid* corrosion-resistant metal properties at the lower cost of *clad* steels.

Lukens makes the most complete range of clad steels available from any source. Plates as thick as 3 inches or as wide as 178 inches, in the extra smooth, easy-to-clean sodium hydride finish, are available. Bulletins 255 and 338 tell you about them. For copies, write Lukens Steel Company, 401 Lukens Bldg., Coatesville, Pa.

LUKENS

Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

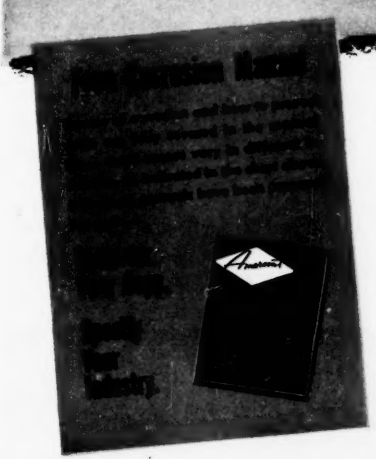
• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

PROTECTIVE COATINGS?

That is the problem... here is the solution!

Typical Food Industry Uses

COATING	DESCRIPTION AND USES	CHARACTERISTICS OF EXPOSURES
#33	A single solution general maintenance coating for metal, concrete and wood surfaces. Unaffected by fruit products, juices, acids, proteins, sugars. Provides a tough, protective film, easily scrubbed and cleaned. Will not support growth of bacteria or fungi. No. 33 makes compliance with rigid sanitation laws easy and economical. It provides excellent protection for walls, ceilings, conveyors, elevators, exteriors of trucks, piping, filters and other processing equipment.	Moisture, dampness, spillage of fruit juices, bottling syrups, water, phosphoric, citric and carbonic acids. Caustic, chlorine or hypochlorite cleaning and sterilizing agents. Milk products, lactic acid, butter fat, protein, sodium, calcium chloride and salt brine spillage. Fish oils, fungus growth and weathering. Milk abrasion.
#23	A three component system suitable for immersion in a wide variety of acids, salts, alkalies, alcohols, syrups and beverages. Odorless, tasteless and non-toxic. Prevents contamination of fruit and vegetable juices, syrups, sugars, meats, spirits, oils and other foods and beverages. No. 23 prevents corrosion of pasteurization jackets, holding vats, homogenizers and storage tanks. Will not harbor bacteria and fungi, and is unaffected by hard scrubbing or steam cleaning.	Constant immersi…ther-ing. Sodium and …nia. Continuous expo… …nd vegetable juice… …or-ine, and hype… …ere abrasion fro… …foot traffic.
#40	Combines the properties of synthetic rubber with the chemical resistance of vinyl resins to produce a protective film of unusual toughness and flexibility with excellent water resistance. No. 40 will stand continuous flexing and has excellent adhesion to rubber, canvas, metal, concrete and wood. Recommended for conveyors and beltings subject to abrasion, spillage of water, grease, oil and other chemical solutions and cleaning agents.	Spilla… …using difficulty …ns. Strong hypochlo…
#88	A pigmented vinyl resin dispersed in water. Recommended as a waterproof coating for masonry walls and ceilings—interior and exterior—of all types of food processing plants. Exceptionally easy to apply. No objectionable odor during and after application. Weatherproof and waterproof. Unaffected by repeated scrubbing with abrasive cleaners.	Constant humidity, steam, fungus growth, mildew, alkalies, vegetable and animal oils, weathering.



Follow the Amercoat line of most resistance...

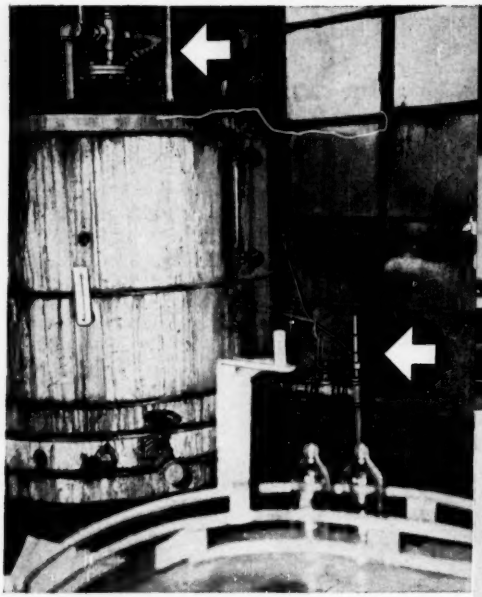
AMERCOAT Protective Coatings are remarkably versatile in their inherent chemical resistance and non-contaminative properties. Yet, no single protective coating formula can provide maximum surface protection under all conditions, without compromise on some desirable quality. Therefore, AMERCOAT formulas are designed for specific uses in industry. They range from specialized linings for chemical and food tanks to general maintenance coatings for metal or concrete surfaces. Each provides maximum protection in its field.

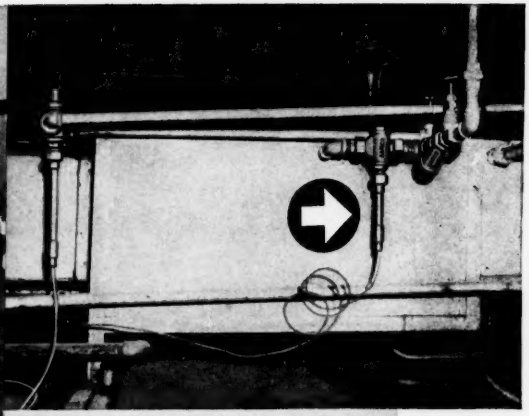
Chemically inert, tougher and much more durable than conventional paint, these remarkable AMERCOAT Coatings are easily applied by brush or spray to metal, concrete or wood. They dry quickly and are extremely resistant to abrasion.

AMERCOAT DIVISION

AMERICAN PIPE AND CONSTRUCTION CO.

Dept. 12D, P. O. Box 3428, Terminal Annex, Los Angeles 54, California

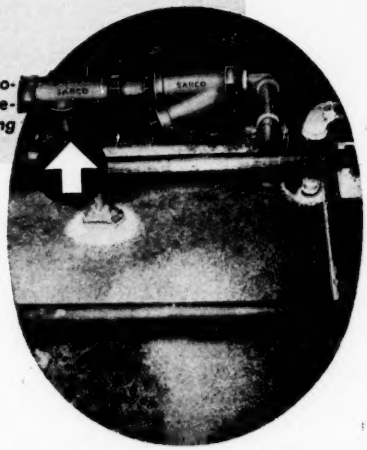




Sarco Controls on Proof Box in Bakery

Sarco 2430 Control on Vinegar Sterilizing Tank.

Sarco 87 Thermoton Reduces Rejects in Tin Plating Tank.



How Sarco REDUCES REJECTS . . .

Process heat is often applied toward the end of the production cycle. A rejected product at this point means lost materials, lost labor, and lost production—all gone forever with no salvage, as a rule.

Many hours of work are represented in the contents of the 1000 gallon per hour vinegar pasteurizer illustrated. Yet, with hand control the vinegar could scorch in a few minutes—or crack the jugs, and it did frequently.

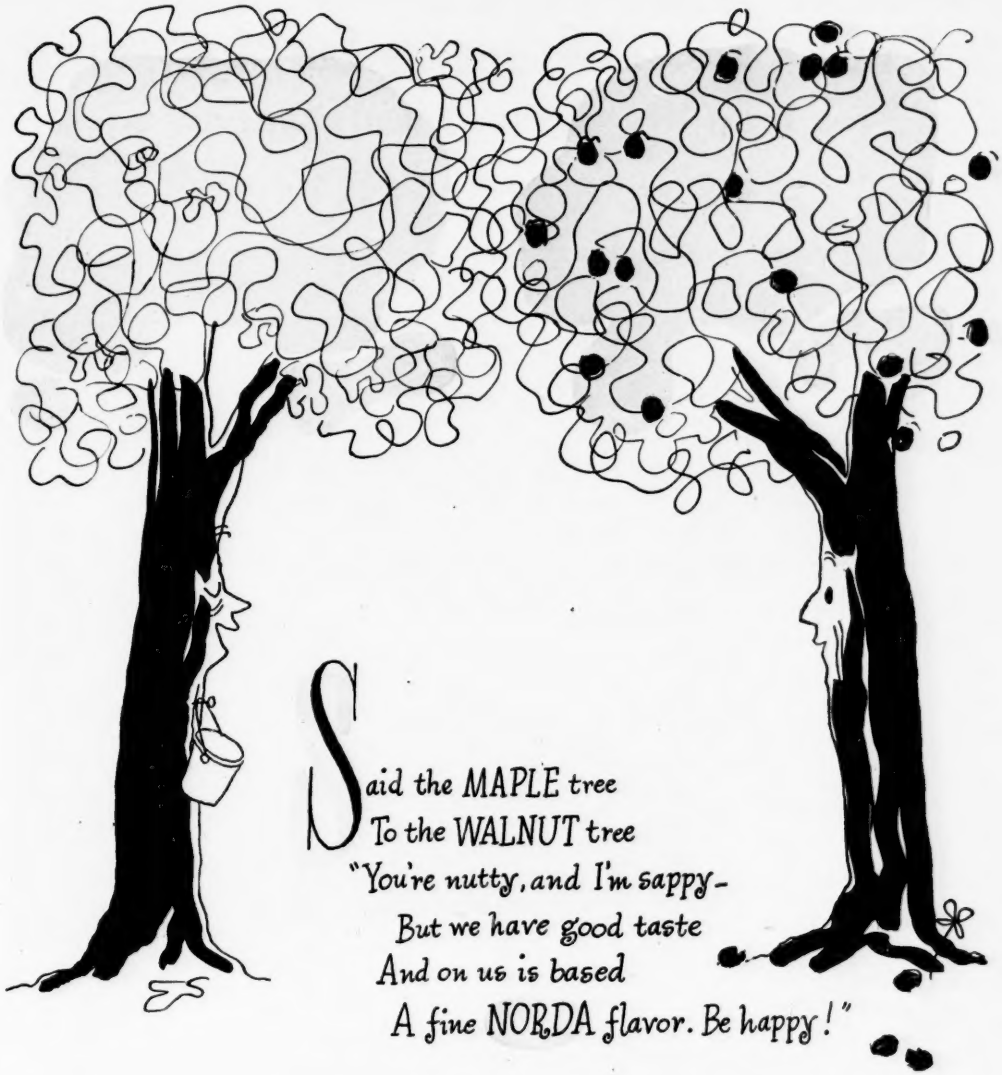
In another part of this plant, old vinegar jugs are caustic-washed previous to being filled with commercial cleaning solution. Two out of six jugs were cracked with hand temperature control. Now all temperatures are controlled with Sarco—all products uniform, day in and day out, and spoilage is negligible.

Other Sarco controls are daily reducing the percentage of rejects in plating, baking (temperature and humidity controls) syrups and a hundred other chemical and food applications, and Sarco Steam Traps are reducing rejects in many industries by keeping heat up in every part of the coils.

231

SARCO
SAVES STEAM

SARCO COMPANY, INC.
Represented in Principal Cities
Empire State Building, New York 1, N. Y.
SARCO CANADA, LTD., TORONTO 5, ONTARIO


Said the MAPLE tree
To the WALNUT tree
"You're nutty, and I'm sappy–
But we have good taste
And on us is based
A fine NORDA flavor. Be happy!"

There's an easy way to stay happy . . . start using Norda Maple Walnut Flavor now.

You'll save money. You'll keep your customers. You'll get steady new business. Norda Maple Walnut Flavor will definitely help make your candies, fondants, syrups, gelatins, and other products more popular with many more people.

Use Norda Maple Walnut to expand and vary your whole product line. Its concentrated, true-tasting richness is typical of the excellence you always expect from Norda.

For free samples of this "favorite to flavor it" . . . complete Norda Flavor Catalogue . . . and expert flavor advice, just write us. Do it today!

Norda **ESSENTIAL OIL AND CHEMICAL COMPANY, INC.**
601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON • PARIS

K&M "Century" Asbestos Corrugated

for long life without maintenance...

The "new" roof on this industrial building is actually more than 3 decades old! A coal operator installed these "Century" Asbestos Corrugated sheets on a coal tipple 33 years ago before he re-used them here.

for modern architectural effect...

Beauty in typically modern style is brought to this store with a facade of "Century" Asbestos Corrugated. This beauty will *last* without any painting or other expensive upkeep.

You've probably noticed that "Century" Asbestos Corrugated is growing in popularity for decorative motifs...inside and outside...for industrial plants, stores, restaurants, theaters. There's a rugged attractiveness in the simplicity of the corrugations and neutral light-gray coloring.

And perhaps it's no news to you that "Century" Asbestos Corrugated is thoroughly practical from the *structural* point of view. It actually *toughens* with age. Never needs to be painted. Can't rot, corrode, catch fire, or succumb to termites.

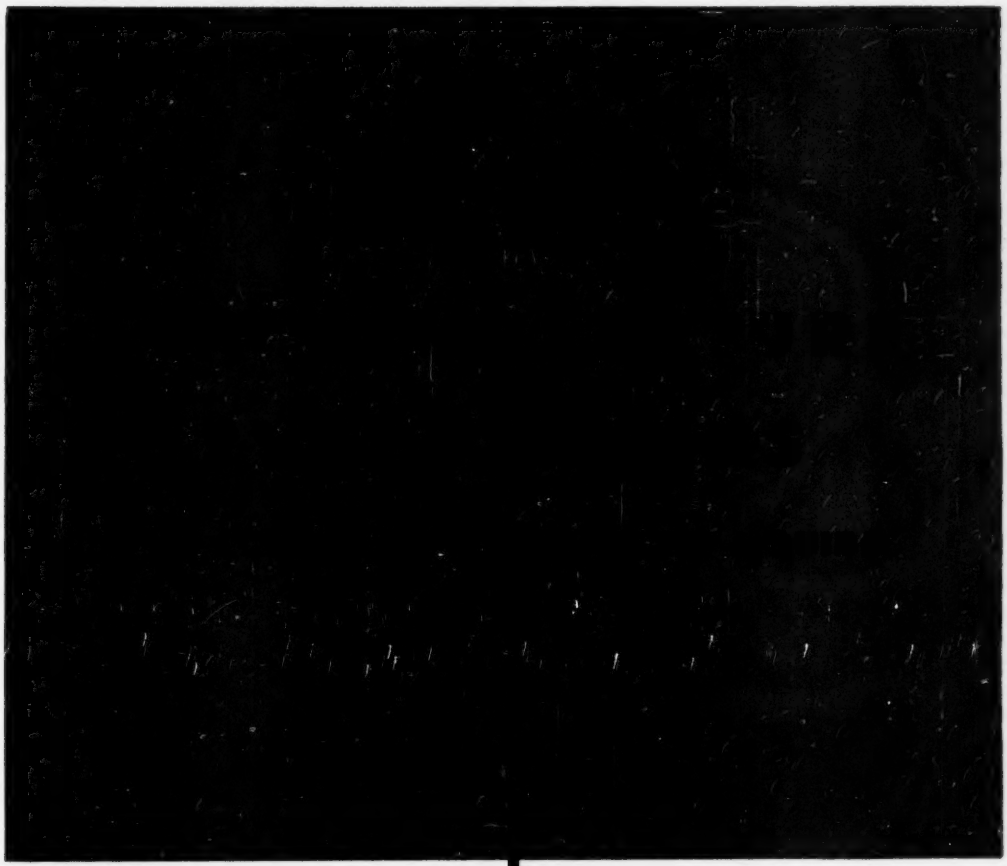
NEW "TOP-SIDE" FASTENERS CUT ROOFING COSTS

On top of all this, you can specify the new "TOP-SIDE" Fasteners, and cut a big slice off the cost of roof installation over steel purlin construction. Exclusive with "Century" Asbestos Corrugated, these new fasteners permit roofing to be done entirely from *atop the roof* ...eliminating entirely the costly labor and scaffolding normally required beneath. This feature, alone, is worth looking into—write us for full details.

Nature made Asbestos... Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

K&M best in asbestos



1. Unusually low operating temperatures.
2. Safe, low operating pressures.
3. Safeguard and preserve the delicate qualities of your product.
4. Uniformly good performance assured by automatic controls.
5. Build profits by maintaining product quality and cutting production and maintenance costs.
6. There are no royalties to deduct from profits! BUFLOVAK equipment is sold outright with protective performance guarantees!

Complete information on request. Or, better still, the BUFLOVAK Research and Testing Plant will process a quantity of your product. You will have actual results beforehand. Write Research Department.

●

BUFLOVAK EQUIPMENT

Division of Blaw-Knox Co.

1631 FILLMORE AVE. • BUFFALO 11, N.Y.

FOOD AND CHEMICAL PROCESSING EQUIPMENT

Is THIS the pump you need?

THE *Electrifugal* PUMP

IT'S COMPACT Pump and motor are combined in one rigid cast iron frame. Fits easily into close quarters—is quickly installed as a "package," and operates in any position—no shafts to align. Just bolt it down, make power and pipe connections, and start pumping. Capacities 15 to 1400 gpm, heads to 500 ft.

IT'S EFFICIENT Drip-proof motor is of Allis-Chalmers Lo-Maintenance design, specially built for pumping service. Pump has such long-service features as bronze wearing rings, new plastic water seal, five or more rings of packing, and first class construction throughout. Every unit is factory tested for efficiency, capacity and head.

IT'S AVAILABLE Many sizes of the Electrifugal and other smaller Allis-Chalmers pumps are now in stock for immediate delivery. Perhaps the size you need is ready. Phone or wire your nearest Allis-Chalmers office or dealer for up-to-the-minute information on availabilities and deliveries. For information on the complete A-C line of centrifugal pumps, ask for Bulletin B6059D. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2381

PEDRIFUGAL
The new A-C pump for flexible Texrope V-belt drive. Capacities to 500 gpm, heads to 100 ft.

SS UNIT
Close-coupled pump and motor units, made in 234 standard ratings, to 2500 gpm.

Electrifugal, Pedrifugal, SS Unit and Texrope are Allis-Chalmers Trademarks.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

NO SHIP was ever fitted with a valve this big. We took broad liberties with proportion in this picture because a valve's size can be misleading. In comparison with larger plant units, the cost of a single valve seems a minor, "petty cash" investment. But if, as here, *all* the valves could be viewed as *one* valve, you would see that valves actually represent a *major* expenditure.

In any plant, any building where operation involves fluid control, it pays management to keep this "collective" valve in mind. These days, especially. You pay more than ever today, in wages and material costs, for every operation in your plant — including valve maintenance.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by *thousands*, it is a serious drain on operating budgets.

JENKINS BROS. helps you meet this problem. In *two* ways. One, by building extra endurance into Jenkins Valves. They are the longest-lasting, lowest-upkeep valves that money can buy. Two, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

For all new installations, for all replacements, rely on Jenkins quality and engineering for lowest valve costs in the long run. *Sold through leading Industrial Distributors.*

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

"PREVENT VALVE FAILURE" is a 28-page guide to valve economy, fully illustrated, with case histories of valve damage, and recommendations for its prevention by proper selection, installation, inspection, and maintenance. FREE on request. Write JENKINS BROS., 80 White St., New York 13, N. Y.

LOOK FOR THIS JENKINS DIAMOND MARK

SINCE 1864

JENKINS VALVES

Types, Sizes, Pressures, Metals for Every Need

CHAMPIONS!...IN ALL CLASSES

Bantam: Trucloader

For fast action, unbeatable stamina and the versatility to handle any assignment in the busiest 1000-pound class, this hard-hitting little machine drops handling costs "for the count." Use it in factory, foundry and mill—in warehouse, stockroom and shipping dock.

Gas-powered and electric battery-powered models; solid or pneumatic tires

Lightweight: Clipper

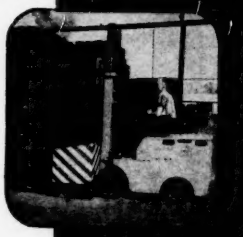
This rugged unit takes on any load-opponent in the 1000, 1500, and 2000-pound classes—and has an extraordinary knock-out record against handling costs. You'll find Clippers busily at work in every branch of industry in which materials are handled.

Gas-powered and electric battery-powered models

Middleweight: Carloader

By Industry's own enthusiastic acknowledgment, here's the Champion of Champions. *More Carloader trucks are on the job everywhere, every day, than any other fork-lift truck model ever built.* It's an astonishing combination of speed, maneuverability and rugged strength.

Gas-powered—
3000, 4000, 5000-lb. capacities
Electric-battery-powered—
4000, 5000-lb. capacities



Heavyweight: Utilitruc

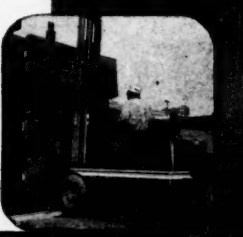
For heavy assignments the Utilitruc wears the crown. This big fellow makes light work of lifting, moving and tiering loads weighing 6000 and 7000 pounds—and gives costs a sound beating. In metal industries, building-materials yards, warehouse and docks, shrewd buyers choose Utilitrucs.

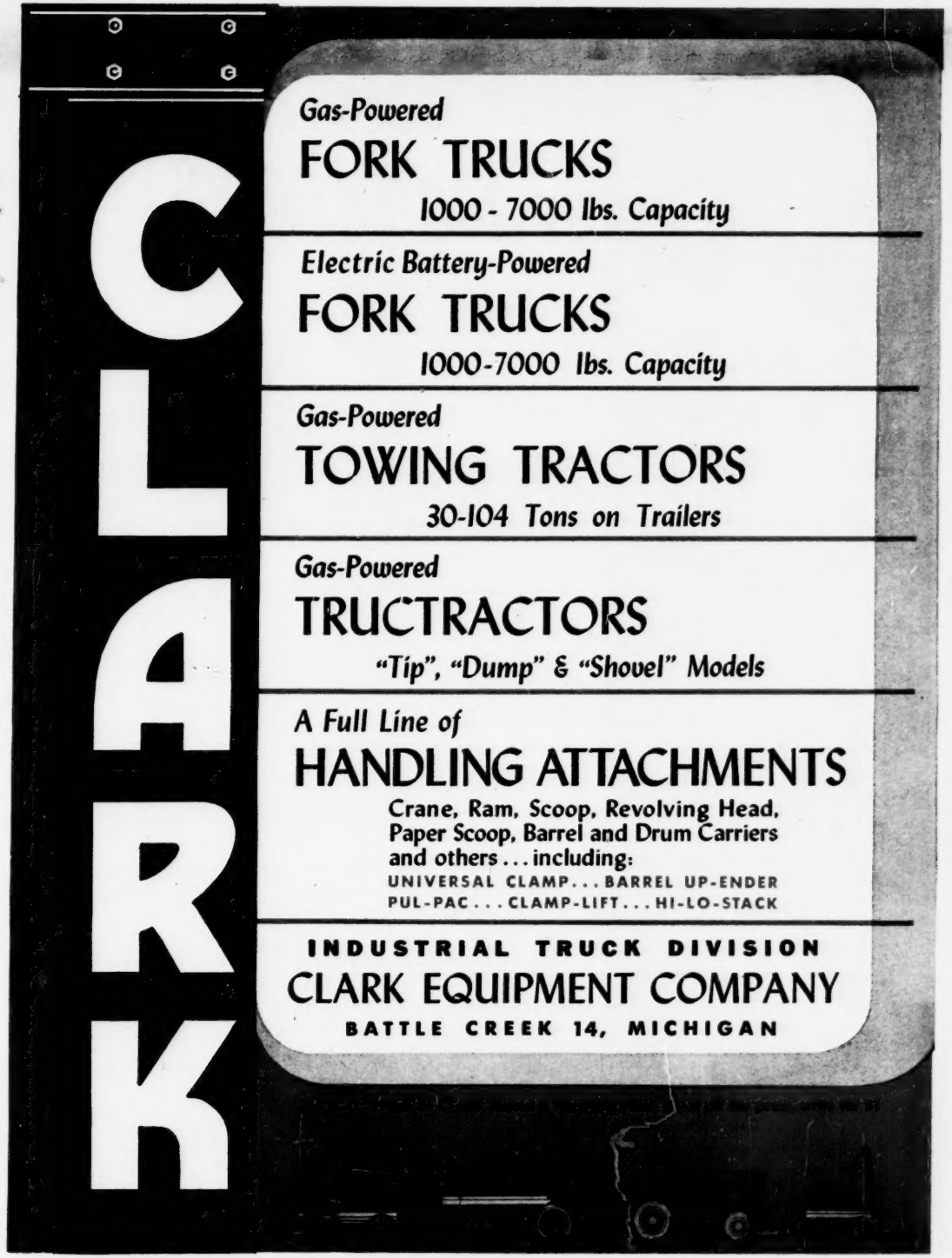
Gas-powered and electric battery-powered

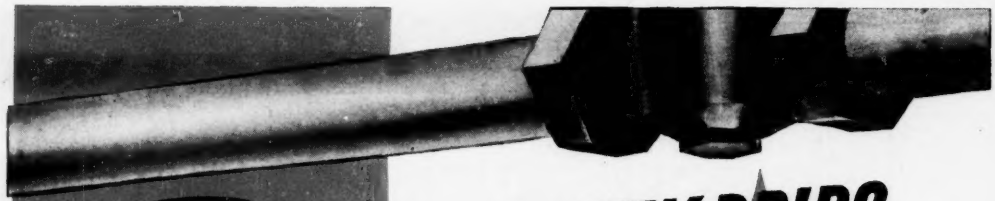
Outdoor Ace: Yardlift

In the Yardlift models, Clark provides strength, efficiency and durability on pneumatic tires. For handling operations that include outdoor storage and passage over rough surfaces, inside or out, the Yardlifts handle their loads swiftly, steadily, safely.

Yardlift 20 — 2000-pound capacity
Yardlift 40 — 4000-pound capacity
Yardlift 60 — 6000-pound capacity




CLARK
Gas-Powered
FORK TRUCKS
1000 - 7000 lbs. Capacity
Electric Battery-Powered
FORK TRUCKS
1000-7000 lbs. Capacity
Gas-Powered
TOWING TRACTORS
30-104 Tons on Trailers
Gas-Powered
TRUCTRACTORS
"Tip", "Dump" & "Shovel" Models
A Full Line of
HANDLING ATTACHMENTS
Crane, Ram, Scoop, Revolving Head,
Paper Scoop, Barrel and Drum Carriers
and others ... including:
UNIVERSAL CLAMP ... BARREL UP-ENDER
PUL-PAC ... CLAMP-LIFT ... HI-LO-STACK
INDUSTRIAL TRUCK DIVISION
CLARK EQUIPMENT COMPANY
BATTLE CREEK 14, MICHIGAN



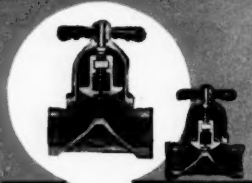
STOP COSTLY DRIPS

In every wasted drop of beer due to leaking valves, there's product loss and added cleanup expense. Costly, too, is valve regrinding and reseating. Breweries handling millions of barrels a year have stopped valve leakage, cut maintenance cost to the bone with

GRINNELL-SAUNDERS DIAPHRAGM VALVES

(Above) Bronze valves with sockets ends.

(Below) Special bronze valve with one end flanged, the other with hose connection.



No leaks The flexible diaphragm assures positive closure and seals the valve against possibilities of leaks with consequent drip.

Positively no taste or color contamination Grinnell-Saunders Diaphragm Valves with bronze bodies have special white composition diaphragms to isolate working parts of valve from fluid. Experience has proved that with this white composition diaphragm there is absolutely no taste or color contamination. These diaphragms are not affected by cleaning action of caustic soda.

When desired, valve bodies are available with linings of glass, porcelain or synthetics to suit particular requirements.

Streamlined flow Streamlined passage without pockets minimizes friction. Large area of contact of diaphragm, plus diaphragm resilience, permit positive closure even when solids are trapped.

Minimum maintenance No reseating, reseating or regrinding is required. New diaphragms can be inserted without removing valve from the line.

Write for catalog—Grinnell-Saunders Diaphragm Valves. Grinnell Company, Inc., Providence 1, R. I.

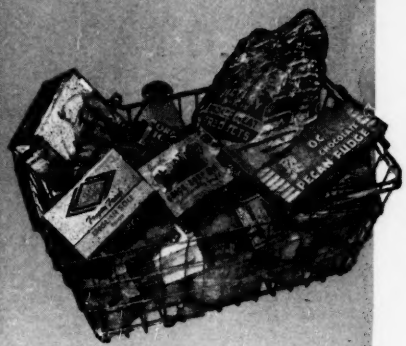
VALVE OPEN	VALVE CLOSED
• No packing glands to demand constant attention.	• Compressor and finger plate support the diaphragm in all positions.
• Working parts completely isolated from fluid . . . eliminating sticking, clogging, corroding.	• No metal-to-metal seats to become damaged, wire-drawn or scored.

GRINNELL

Alcoa's "do-you-know" series for package buyers

A FOOD PACKER ASKS:

"How does foil preserve food flavors?"



ANSWER: Loss of flavor in foods is usually caused by dehydration and oxidation. A midwestern research organization reports: "Numerous tests in our laboratory indicate that aluminum foil offers the best apparent barrier to oxygen and moisture vapor of all wrapping materials on the market at the present time." Alcoa Foil protects against the loss or absorption of gas, grease, and resists vermin infestation.

QUESTION:

"Will Alcoa Foil operate on high-speed packaging machines?"

ANSWER: Alcoa Foil may be used with almost all types of modern high-speed packaging equipment either plain, in combination with supporting sheets, or in package structures such as wraps, bags, cartons, and rigid containers.

Write for complete "do-you-know" series

It will pay you to find out the answers to questions asked by other package buyers about Alcoa Aluminum Foil. Send for *free* "do-you-know" series, today. Address: ALUMINUM COMPANY OF AMERICA, 1845 Gulf Bldg., Pittsburgh 19, Pa.

ALCOA ALUMINUM

ALCOA ALUMINUM FOIL

THE QUALITY PACKAGING MATERIAL FOR QUALITY PRODUCTS

food plant $1680 per year in power costs

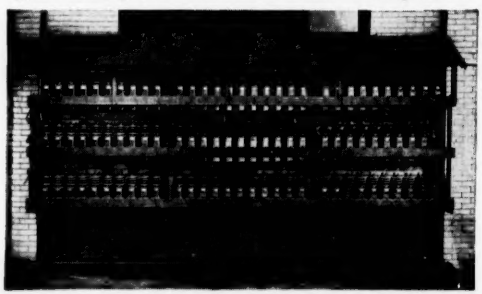
...That's what a Buffalo milling company gets by using G-E Pyranol capacitors to raise its power factor from 65 to 95 per cent

In handling flour, feed, and grain products, the Russell Miller Milling Company uses 1800 to 1900 hp, chiefly to drive induction motors. With considerable reactive kva being drawn for this purpose, the plant had to pay the power company a service charge of $1680 annually.

A bank of G-E Pyranol capacitors was installed. Now—with power factor raised from 65 to better than 95 per cent—$1680 is saved in yearly power costs.

This is typical of what you can save with capacitors, if you have a power-factor or kva-demand clause in your power contract. Even if you don't, capacitors can provide relief if you have overloaded circuits, or want to add to fully loaded circuits.

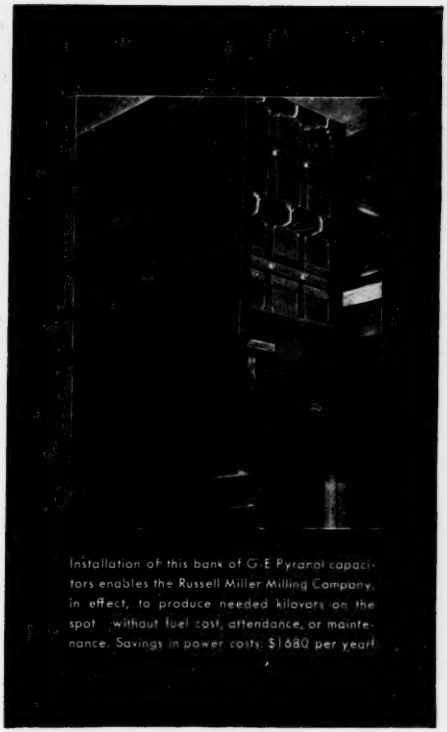
Even in small food plants, capacitors can pay for themselves within two years. And you can get G-E Pyranol capacitors, in most ratings, in only four weeks. Send for Bulletin GEA-2742D, "Pyranol Capacitors for Low-Voltage Industrial Applications." *Apparatus Dept., General Electric, Schenectady 5, N.Y.*



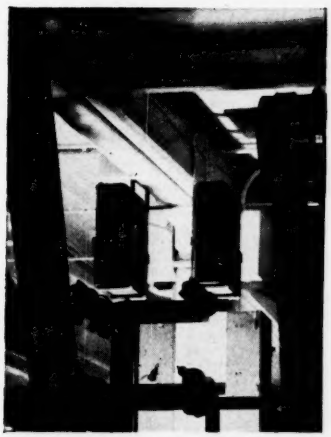
One of six banks of G-E capacitors installed near load centers in a Syracuse plant. By removing a 54% overload from transformers, and raising power factor to 95.5 per cent, capacitors save this plant $1800 per year on power costs, and provide an annual return of about 30 per cent on the capacitor investment.

ELECTRICAL AIDS for FOOD PLANTS

GENERAL ELECTRIC



Installation of this bank of G-E Pyranol capacitors enables the Russell Miller Milling Company, in effect, to produce needed kilovars on the spot—without fuel cost, attendance, or maintenance. Savings in power costs: $1680 per year!



In the dust-laden, high-humidity atmosphere, these dust-tight G-E capacitors in a Southern mill have needed no maintenance since their installation. In this case, addition of 1080 kilovars of capacitors brought about a $5000 saving in the first year—enough to pay for the capacitors in 18 months.

FOR A CHANGE OF PACE

The G-E Packaged SPEED VARIATOR

Here's an adjustable-speed drive that gives you d-c performance from a-c power, and smooth, simple speed control over a 16 to 1 speed range. With the G-E packaged speed variator, you can get increased utility from your machines, better co-ordination of food processing throughout your plant.

In this newly-designed "package," mass production from standardized parts enables you to get an engineered system at a comparatively low price. Compact and attractive, the power-unit case contains motor-generator and control. By combining these two components, installation is simplified, and costs are also reduced. You can conveniently locate the unit apart from the d-c driving motor. Operation is simple. A push-button station and a speed control knob, placed wherever desired, are the only controls your operator needs.

All covers of the power unit enclosure are readily removable, providing easy access for quick inspection. Maintenance is cut to a minimum because the sturdy, easy-to-clean case prevents entry of food particles or dripping liquids. For a full description of the G-E packaged speed variator—available now in ratings of 3 through 60 horsepower—send for Bulletin GEC-280.

WANT MORE DATA?

General Electric Company, Section A-653-37
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

☐ GEA-2742D—Pyranol Capacitors
☐ GEC-280—Packaged speed variator

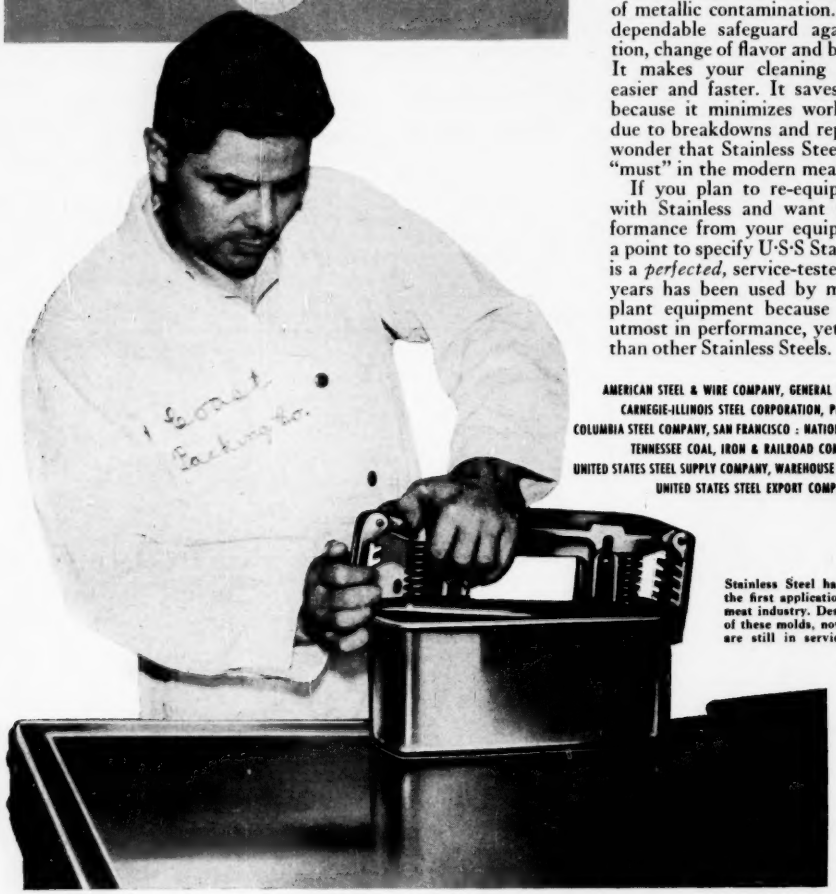
Name.....

Company.....

Street.....

City.....State.....

Why do leading meat packers use STAINLESS STEEL ALMOST 100% in their equipment?



. . . the reason is very simple:

They have found that it is cheaper to use Stainless than not to use it.

Results have proved that Stainless Steel does so much more, does it so much better, and lasts so much longer that no other material used in meat packing equipment can approach it for true economy. Stainless Steel, in fact, pays off in three important ways: by ensuring better, closer quality control; by speeding up operations; by materially reducing maintenance and repair costs.

Consider the many benefits you obtain with Stainless Steel. It ends the bug-bear of metallic contamination. It gives you a dependable safeguard against discoloration, change of flavor and bacterial attack. It makes your cleaning and sterilizing easier and faster. It saves precious time because it minimizes work interruptions due to breakdowns and replacements. No wonder that Stainless Steel has become a "must" in the modern meat plant.

If you plan to re-equip or modernize with Stainless and want the *finest* performance from your equipment, make it a point to specify U·S·S Stainless. For here is a *perfected*, service-tested steel that for years has been used by makers of meat plant equipment because it ensures the utmost in performance, yet costs no more than other Stainless Steels.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND OHIO
CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO : NATIONAL TUBE COMPANY, PITTSBURGH
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Stainless Steel ham molds were among the first applications of Stainless in the meat industry. Despite hard usage, many of these molds, now almost 20 years old, are still in service.

USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

8-1626

UNITED STATES STEEL

EATON AXLES

Pay for Themselves!

Eaton 2-Speed Axles not only add to motor truck utility and performance, but they actually effect important savings in operating and maintenance costs and add materially to vehicle life. Because Eaton 2-Speed Axles provide the right gear ratio for every road and load condition, engines may be run in their most efficient and economical speed range. Stress and wear on major vehicle parts are held to a minimum. On most trucks of 1½ tons and larger, Eaton 2-Speed Axles will actually *more than pay for themselves.* See your truck dealer for complete information.

More Than a Million Eaton 2-Speed Axles in Trucks Today

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

OTHER EATON PRODUCTS

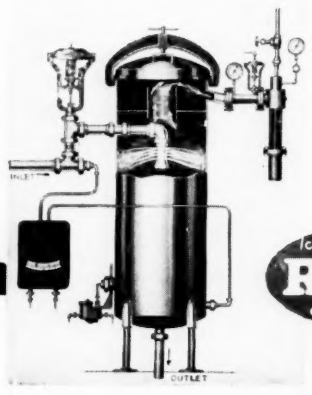
THE *Toughest* BUYER IN THE WORLD!

WHEN a woman buys baby food, she makes no compromise with quality. She demands the finest in flavor, aroma, color, and nutrition. You can be sure your products will meet her critical standards, with a Rex Micro-Film Deaerator in your processing line.

In this new development in deaeration, the product is impinged at high velocity on the interior surfaces of a stainless steel vacuum chamber. The controlled vacuum causes a small portion to "flash" or boil into vapor, providing instantaneous removal of oxygen and forcing the dissolved and occluded air out of solution. In addition to protecting food quality, this also increases product fluidity, which speeds filling and allows more efficient use of labor and machines.

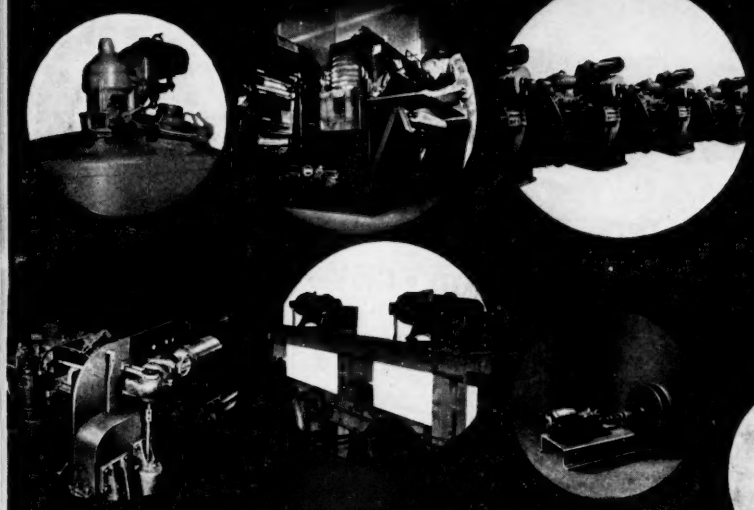
As well as handling baby foods, Rex Micro-Film Deaerators also provide the same continuous, efficient, sanitary removal of oxygen from condiments, salad dressings, salad oils, and soups. They assure the best method of producing the most nutritious, salable liquid or semi-liquid foods at the lowest cost.

A Rex expert will be glad to show you how Rex Micro-Film Deaerators can help solve your food processing problems. Write Chain Belt Company, 1616 West Bruce Street, Milwaukee 4, Wisconsin, to arrange for his visit. Or ask for your free copy of Bulletin 47-1.



Cross-section view of Rex Micro-Film Deaerator. Note how product is impinged in thin streams against stainless steel interior of vacuum chamber.

CHAIN BELT REX COMPANY — FOOD PROCESSING EQUIPMENT



On thousands of applications, stepless variable speed operation assures exactly the right speed for every operation . . . for each operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a better quality product and more efficient performance of your equipment and your operators.

IT PAYS

Master Speedrangers provide this infinitely variable speed in compact, all-metal, mechanical variable speed units in a wide range of types and sizes up to 5 horsepower.

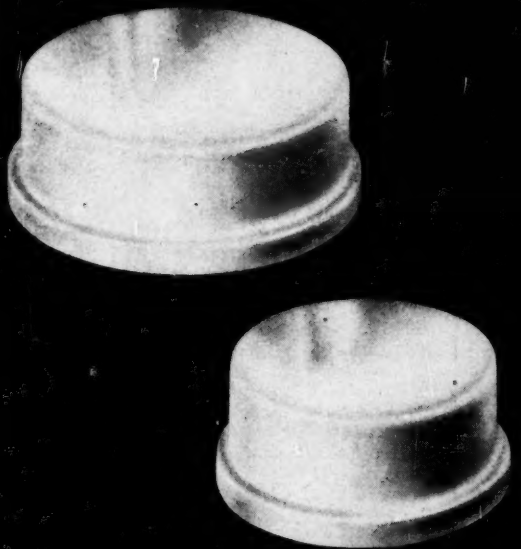
See how the Speedrangers on the applications shown incorporate an electric motor, a variable speed unit, a gear reduction, and an electric brake . . . all standard Master units that easily combine into a compact, integral power drive. This provides exactly the right speed, the right features, in a unit that you can use right where you want it.

Write for Data 7525, a new 24-page book on Speedrangers, and see what a real job they can do for you.

MASTER SPEEDRANGERS

THE MASTER ELECTRIC COMPANY · DAYTON 1, OHIO

THEY'RE NEW THEY'RE FAST
THEY'RE PROVED
THEY'RE Anchorvac* CATSUP • CHILI SAUCE CAPS

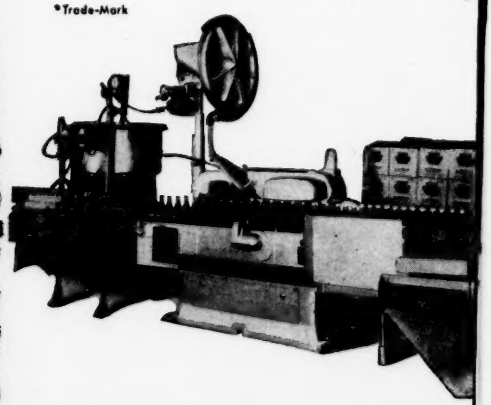


THE new *Anchorvac* Catsup and Chili Sauce Caps provide a dependable high vacuum seal for catsup, chili sauce and other sauces and condiments, whether packed hot or cold. In packages sealed with these new *Anchorvac* Caps product color, texture and flavor are retained longer . . . product discoloration, black neck and neck plug are effectively prevented. In housewives' hands the caps are easily and quickly removed and when pressed back on they form a hermetic seal to protect unused contents.

Now *Anchor Steriseal* Machines make possible high speed, straight-line production for your packs. Available at nominal rentals, they will apply these new *Anchorvac* Caps with a steam vacuum seal at speeds ranging from 75 to 250 per minute.

Foremost food processors are already using the new *Anchorvac* Catsup and Chili Sauce Caps. You, too, can benefit by sealing your sauces under vacuum with these new caps. Ask your Anchor Hocking representative for samples and full details or write us.

*Trade-Mark



ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

IN UNSCRAMBLING

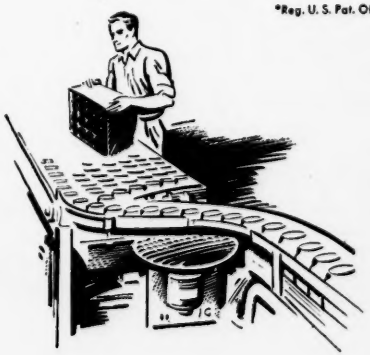
It's shock-resistant Anchorglass*

UNSCRAMBLERS start the ball rolling for glass production line speeds up to 400 per minute. But here at unscrambling tables glass containers are subjected to more than one of many shocks. Glass must be exceptionally tough and strong to take them. *Anchorglass* containers are. They successfully withstand the shock of dumping and the chatter and jangling as they are herded on to conveyors.

Anchorglass containers' high level performance in unscramblers is the result of improvements in container design; consistency in manufacture; uniform distribution of glass; accurate temperature control in annealing; quality control through laboratory tests and regular inspections in every plant, and in Anchor Hocking's constant emphasis on higher manufacturing standards.

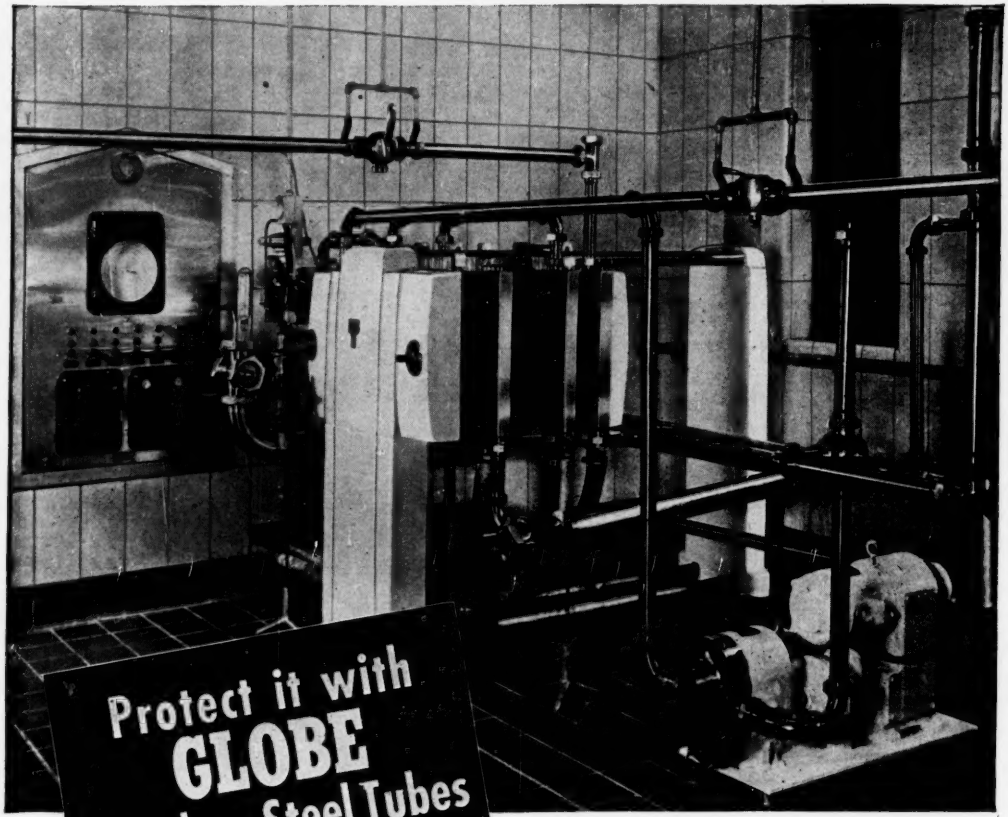
Anchorglass containers are available in all popular styles and capacities, in crystal, amber or emerald green glass to suit your particular packaging needs.

*Reg. U. S. Pat. Off.



ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

SANITATION . . .



To protect purity of product, to avoid contamination, to reduce corrosion and to gain maximum, long-range economy—use Globe Stainless Steel Tubes.

Food and process manufacturers prefer the security, sanitation, and safety of Globe Stainless Steel Tubes for many reasons:

— it is tubing that is chemically and physically inert to food and process products — is not itself affected nor does it affect them.

— special polishing equipment is used to produce the perfect inside and outside polished finishes that are so desirable in the food, dairy and other industries.

— the normal flow of liquids and cleaning compounds tends to keep Globe polished tubing naturally clean.

— no dependence on thin coatings; the entire wall thickness is stainless steel. Daily scouring only improves the polish and contributes to sanitation.

The Globe Steel Tubes Co. is equipped to bend, polish, expand swage, coil, and form stainless steel tubes. Globe stainless tubes can be furnished round, oval, square, rectangular, hexagonal, octagonal, streamline and other shapes. We will gladly cooperate with you on any tube problems which you may have, and will make recommendations as to the best analysis suited, based on previous experience and tests.

Write for Bulletin No. 115A and complete information on Globe Seamless Stainless Steel Tubes and Gloweld Welded Stainless Steel Tubes.

GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin

GLOBE
Stainless
STEEL TUBES

Select the Correct

Century MOTOR

For Your Liquid Pumping and Refrigeration Requirements

Century's wide range of types, kinds and sizes assures motors that exactly meet the power requirements of your equipment.

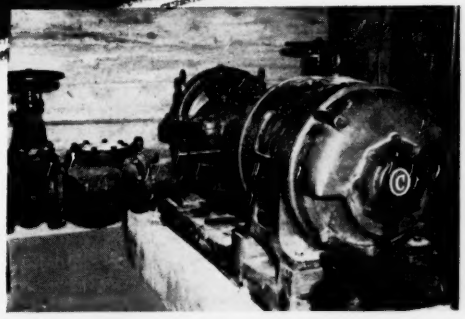
Whether the application is a centrifugal pump or an unloaded compressor, deep well pump or compressors started under full load—there is a motor available in single phase, polyphase or direct current.

Drip-proof, splashproof, totally enclosed fan cooled and explosion-proof frames are available to protect the vital parts of the motor against any kind of hazardous atmosphere.

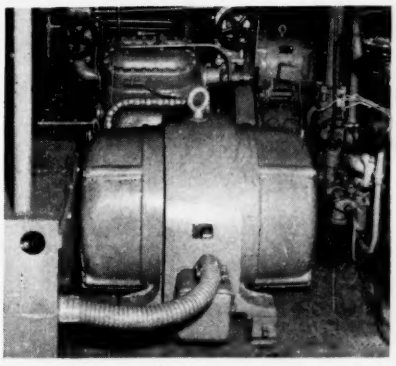
UNSEEN because they are sealed-in—many thousands of integral and fractional H. P. Century Hermetic Motors have been successfully serving the Refrigeration Industry for fifteen years.

Century builds a complete line of electric motors in a wide range of types and kinds, in sizes from 1/6 to 400 horsepower.

Specify Century motors for all your electric power requirements.



● 150 horsepower Century motor driving a water pump for a large central station.



● 50/25 horsepower Century splashproof motor driving a refrigeration compressor in a bottling plant.

Century MOTORS

Popular types and ratings are generally available from factory and branch office stocks.

-610

[illegible] ELECTRIC COMPANY • 1806 Pine St., Saint Louis 3, Missouri

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HOW TO MARKET YOUR PRODUCTS WITH CLEAN, SMOOTH, UNTORN LABELS

YOUR one best insurance toward an always clean, appealing package . . one that literally shouts aloud—"BUY ME, I'M BETTER"—is to entrust your label adhesive needs to PAISLEY. The swing in modern retail merchandising is toward self-service . . towards on-the-spot *impulse* buying. How necessary it is, then, to make certain that YOUR labeled packages look factory-fresh in the stores, with clean, smooth, untorn labels.

PAISLEY Can Labeling Adhesives are playing an increasingly important part in bringing products to market in perfect condition. If you want the ONE best can or jar labeling adhesive for a SPECIFIC operation, submit the facts to Paisley. Their skilled adhesive chemists will subject them to scientific laboratory analysis, then send you recommendations. This valuable service doesn't cost you a penny, nor does it obligate you to buy!

Here are some of the types of finer, field-tested adhesives developed by our scientific staff:

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2. COLD PICK-UP GUMS
3. LAP BELT PASTES
4. VARNISHED LABEL LAP PASTES
5. BOTTLE LABEL GLUES
6. MOISTURE-RESISTANT LABEL CEMENT
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Free Consulting Service for All Adhesive Users!

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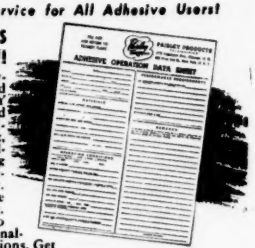

There's a laboratory-developed, tested and controlled PAISLEY scientifically designed Adhesive for practically every fabricating, manufacturing, product labeling and sealing operation. Buy adhesives the scientific way. Send for an Adhesive Operation Data Sheet. Fill in and return it to our laboratory for analysis and recommendations. Get the ONE best adhesive for the SPECIFIC operation. Write today. There's no obligation.

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America's Choice

CHEVROLET ADVANCE-DESIGN TRUCKS

for All-Around Value!

Ask the experts—

If you ask the drivers, they'll say:

"Chevrolet Advance-Design Trucks can and will take it day after day, month after month. They're easy to handle . . . built with driver safety and comfort in mind."

The mechanics insist:

"Chevrolet trucks last longer because they're designed, engineered and built for the job. They're easier to work on . . . built with an eye to economical maintenance."

The owners will tell you:

"Only Chevrolet has the TRIPLE ECONOMY of low cost operation . . . low cost upkeep . . . and the lowest prices in the entire truck field."

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

Only the Leader—Chevrolet has all these features:

NEW CHEVROLET 4-SPEED SYNCHRO-MESH TRUCK TRANSMISSION

A special feature in one-ton and heavier duty models that assures new operating ease and efficiency.

THE CAB THAT "BREATHES"

Here are the trucks with the famous cab that "breathes"! Outside air is drawn in and used air is forced out! Heated in cold weather.*

FLEXI-MOUNTED CAB

Chevrolet's Advance-Design Cab is mounted on rubber, cushioned against road shocks, torsion and vibration.

IMPROVED VALVE-IN-HEAD ENGINE

The world's most economical engine for its size now has greater durability and operating efficiency.

SPLINED REAR AXLE HUB CONNECTION

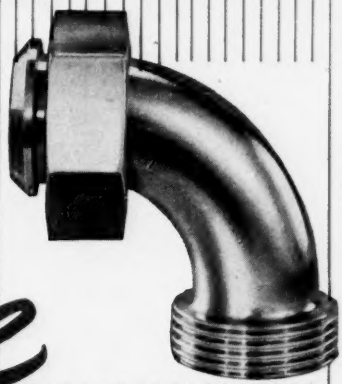
Greater strength and durability in heavy-duty models with this exclusive Advance-Design feature.

PLUS Uniweld, all-steel cab construction • New, heavier springs • Full-floating hypoid rear axles on ¾-ton and heavier duty models • All-round visibility with rear corner windows* • Specially designed brakes • Hydrovac power brakes on two-ton models • Ball-bearing steering • Double-line pre-selective power shift in 2-speed axle at extra cost on two-ton models • Wide base wheels • Standard cab-to-axle-length dimensions • Multiple color options.

**Heating and ventilating system and rear corner windows with de luxe equipment optional at extra cost.*

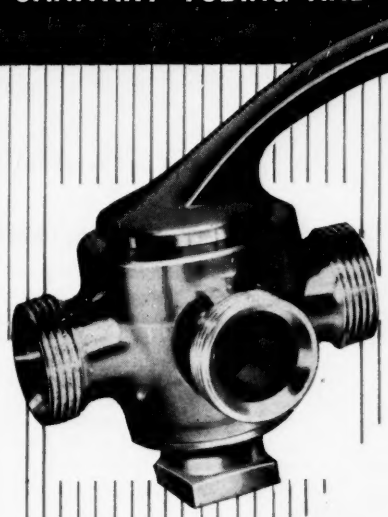
CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED

CHEVROLET



for fine

SANITARY TUBING AND FITTINGS . . . CHERRY-BURRELL!



● **The complete Cherry-Burrell line of sanitary valves, tubing, and fittings offers you the ultimate in precision-built protection of your products.**

Cherry-Burrell "Diamond" and stainless steel sanitary fittings and valves are fabricated from virgin metals of fine quality. Both types are hard, noncorrosive, dense and nonporous—designed throughout to meet modern sanitary requirements. Close tolerance workmanship and standardized design mean long life . . . easy interchangeability . . . easy use. Fast delivery from nearby stocks.

Cherry-Burrell stainless steel tubing meets the highest sanitary and plant performance requirements. All standard sizes in stock. Immediate delivery. See your Cherry-Burrell representative, or write the address below for bulletin G-443.

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General Sales and Executive Office:
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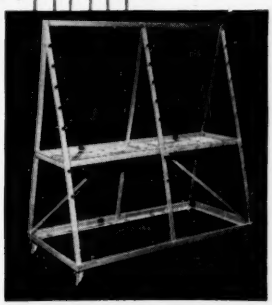
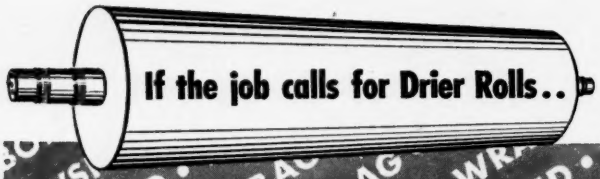
Milk and Food Plant Equipment and Supplies
FACTORIES, WAREHOUSES, BRANCHES, OFFICES OR DISTRIBUTORS AT YOUR SERVICE IN 56 CITIES

trendmaker in a great industry



CHERRY-BURRELL SANITARY PIPE AND FITTING TRUCK

Here's an efficient partner when you're taking down, washing, and putting up sanitary pipe lines. You can put tubing and fittings on the rack in order of dismantling, make one trip to wash tank, and set up in proper order with no mislaid parts. Easy to move and clean, strong, and non-tipping.



If the job calls for Drier Rolls..

A SURVEY OF 32 MILLS SHOWS

Lukenweld Drier Rolls are at work with every type of paper

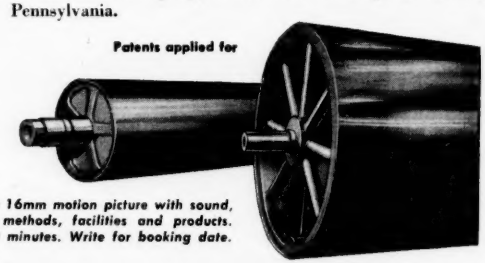
High pressures safely employed with Lukenweld Drier Rolls can be used to boost surface temperatures. "What does that mean when we're working with thinner papers?" millmen have asked. The answer is, Lukenweld Drier Rolls are being successfully used in producing every type of paper listed here. And their users come back for more, time after time.

Lukenweld Jacketed Steel Drier Rolls help speed up production—positive scavenging of steam passages flushes out air and condensate, assuring high efficiency. Product quality is higher because surface temperatures are more uniform and constant. Simple in construction, there's nothing to get out of order; can be designed without bolts, nuts or siphons to work loose in service.

In Chemical, Drug, Food and Plastics work, too

Lukenweld Drier Rolls are serving similarly here—crystallizing drugs and chemicals by heating or chilling, drying or freezing foodstuffs. The ability to transfer heat quickly and evenly provides the same economic advantages to these industries.

If your drying problem can be solved by drier rolls, let our engineers help you select the Lukenweld Rolls to handle it; any diameter, 24 inches or 18 feet—lengths to suit each task—plain steel, polished or plated surfaces, or any of the Lukens corrosion-resistant clad steels. Write Lukenweld, Division of Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.



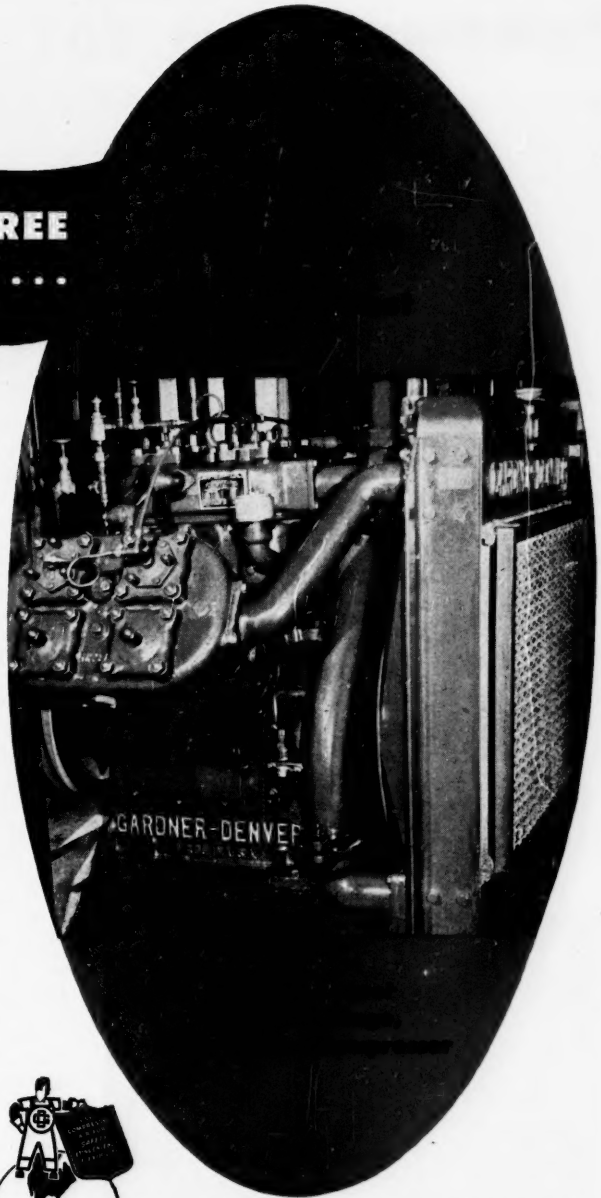
We'll lend you . . . "LUKENWELD", a 16mm motion picture with sound, highlighting our methods, facilities and products. Running time: 20 minutes. Write for booking date.

LUKENS
LUKENWELD DIVISION

DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

You get ALL THREE with a "WB" . . .

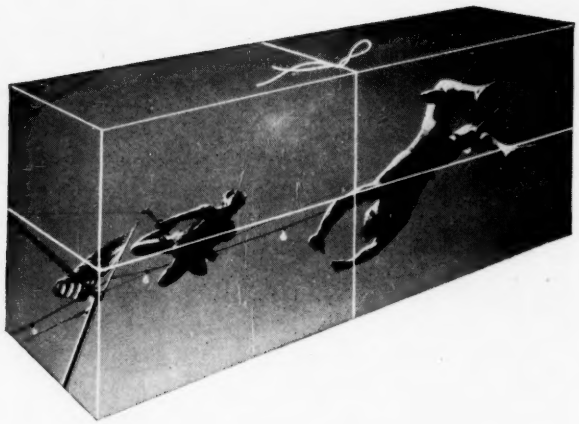


Gardner-Denver "WB" Vertical Compressors have the compactness you need for installation in limited space . . . yet because of their special design, these compressors have high efficiencies. Air output is much greater than that obtained with single-stage compressors of equivalent piston displacement. All cylinders are completely water-jacketed, assuring reliable operation in any temperature and at any altitude. Other valuable "WB" features are:

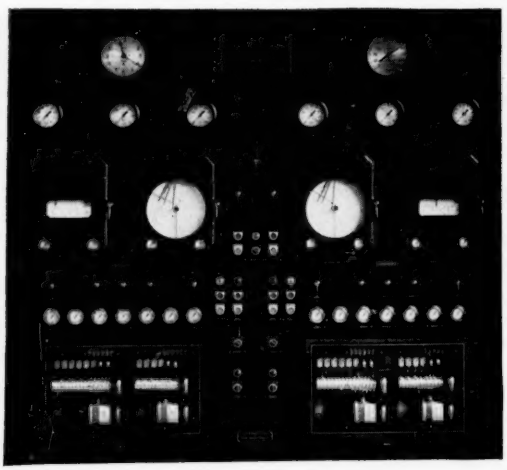
- *Combination radiator and air-cooled intercooler permits use where cooling water is scarce or of poor quality.*
- *Completely water-jacketed cylinders for maximum operating efficiency in any temperature or at any altitude.*
- *Duo-Plate cushioned air valves—simple, durable, unusually quiet.*
- *Timken tapered roller main bearings.*
- *Crankcase of GarDurloy alloy—completely enclosed, dust tight, oil tight.*

For complete information, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER
SINCE 1859



Let us wrap you up a "package" of *Coordinated Control!*



HOW can you beat rising costs—and competition too? Only by turning out a top quality product with a minimum of rejects and re-runs. That also means operating at top efficiency with minimum consumption of steam or other processing media. And it means freeing your operator of responsibility for complicated processing techniques—many of them impossible under manual control. For instance, only occasional supervision is needed even on multiple effect evaporators.

Taylor-engineered Coordinated Control Systems accurately and automatically regulate functions involving sequence and duration of temperature, pressure, humidity, flow and liquid level. Processes like juice evaporation, rubber vulcanizing, starch making, pulp bleaching, cloth dyeing, tobacco tempering, removal of insects from spices and other foods subject to infestation, etc.

How do you get a "package" of Taylor Coordinated Control? First, call in your Taylor Field Engineer. He'll begin by carefully analyzing your problems. Then he'll turn the job over to Taylor Application Engineers—specialists in every branch of instrumentation. Their specialized knowledge will go into the design and assembly of the coordinated control system your specific problems require. You'll receive it complete with all instruments mounted, piped and wired for interlocking or interconnecting with your processing equipment.

Result—with every function of your most complicated process at your fingertips, you'll know it's running at full efficiency. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

WHY SHOP FOR A BOILER??

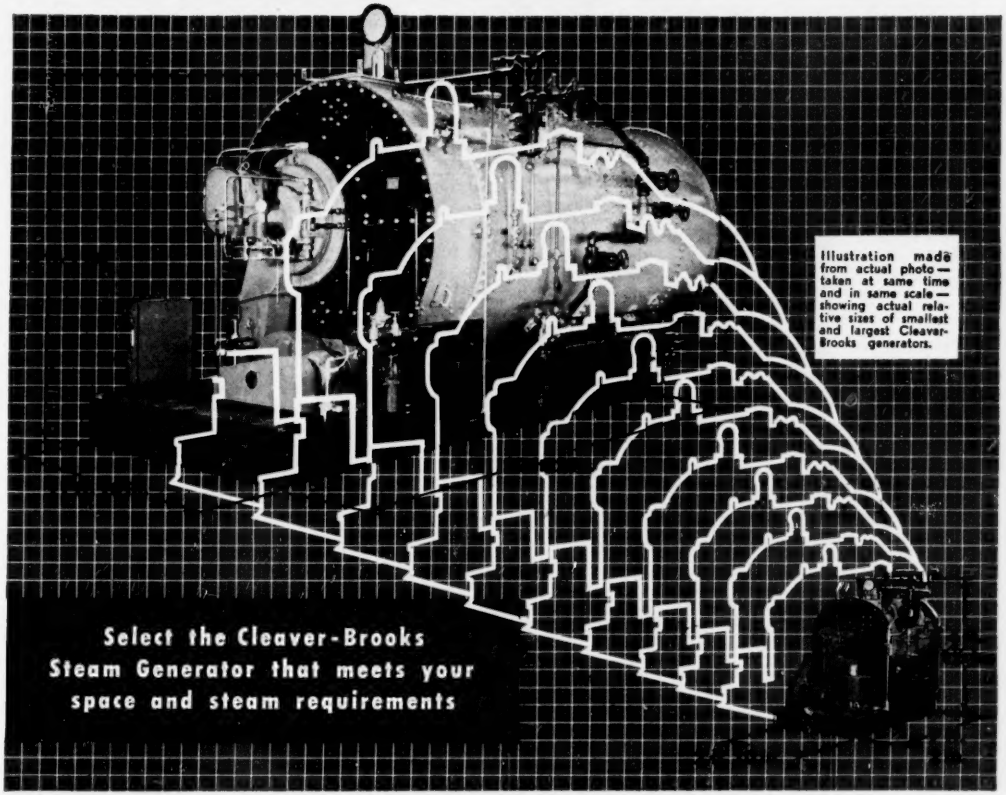


Illustration made from actual photo — taken at same time and in same scale — showing actual relative sizes of smallest and largest Cleaver-Brooks generators.
Select the Cleaver-Brooks Steam Generator that meets your space and steam requirements

WHY search and shop for a boiler — install a Cleaver-Brooks engineered and packaged steam generator that fully meets your steam requirements and needs only a minimum of space and headroom.

You can select from a range of sizes 15 to 500 hp. — and you can have your Cleaver-Brooks steam generator equipped for oil, gas, or with a combination burner which permits alternate use of gas or oil and provides for a quick change-over from one fuel to the other.

Equally important — you get Cleaver-Brooks guarantee of at least 80% efficiency from full load down to 30% of rating — with either gas or oil as fuel — and IN ALL SIZES.

Cleaver-Brooks steam generators enable you to burn the available fuel in your area — give you clean, smokeless operation—eliminate fuel and ash handling — need no high or costly stacks — no special foundations — fit under low headroom and into limited space — provide flexible operation to meet fluctuating loads — fully meet all codes.

Oil or Gas Fired . . . Guaranteed 80% Efficiency from Full Load Down to 30% of Rating . . . IN ALL SIZES

Available in a size to fit your needs — 15 to 200 p.s.i., 15 to 500 hp.—write for Cleaver-Brooks Steam Generator bulletin.

CLEAVER-BROOKS COMPANY, 352 E. Keefe Ave., Milwaukee 12, Wis.

WRITE on your business letterhead for Free Steam Cost Calculator — a ready reference slide rule showing the comparative steam costs when using oil, gas or coal as fuel.

Cleaver-Brooks

"Packaged" STEAM GENERATORS

HAVE SERVED INDUSTRY FOR MORE THAN FIFTEEN YEARS

A NEW experience in laboratory microscopy

● You *feel* the difference . . . You *see* the difference . . . from the first moment you begin to focus a new Bausch & Lomb BAV Laboratory Microscope.

You obtain proper adjustment faster, more accurately, with less effort . . . superlative performance resulting from advanced mechanical features such as the variable focus condenser, threadless cell lens mounts, nosepiece with roller bearing stop, coarse adjustment with *matched* rack and pinion, and patented lever fine adjustment.

Most important of all, you *see* better. Images of unmatched clarity and sharpness are provided by the world's finest optical system.

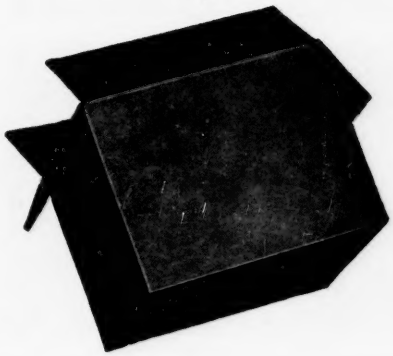
Before you buy a new laboratory microscope be sure to see the Bausch & Lomb BAV.

WRITE for a demonstration to Bausch & Lomb Optical Company, 603-A St. Paul St., Rochester 2, N. Y.

the Bausch & Lomb BAV Laboratory Microscope

The Pedigree is Assurance of Consistent Performance

...In boxes, too!



THE BOSTON TERRIER was bred in Boston about sixty years ago from English Bulldog and white English Terrier stock. This little fellow is exceptionally lively and bright, and truly deserves his title of "American Gentleman."

CONSISTENT *Quality*
CONSISTENT *Service*
CONSISTENT *Fair Price*

THE pedigree of a Union box goes all the way back to the trees in the forest. The Union shield trade-mark on a corrugated container means nothing has been left to chance.

Completely integrated production, under one management, in the largest Kraft pulp-to-container plant in the world is checked and re-checked at every step to maintain consistent quality without variation.

Union containers are backed by 75 years of leadership in paper packaging. Five of the nine largest paper machines in the world and four modern box plants give you boxes when and where you need them.

UNION *Corrugated Containers*

UNION BAG & *Paper Corporation*

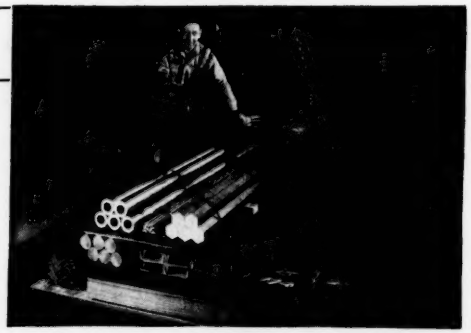
Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

Corrugated Container Plants: SAVANNAH, GA. • CHICAGO, ILL. • TRENTON, N. J.

Ryerson Answers Important Steel Questions

What can we get?

You can usually get enough carbon, alloy or stainless steel from stock to meet maintenance and repair requirements—and some new equipment needs as well. Tremendous demand often limits the amount that can be shipped, but stainless is in particularly good supply—in fact both alloy and stainless bar stocks and carbon and stainless tubing stocks are better than average. See the product list below.

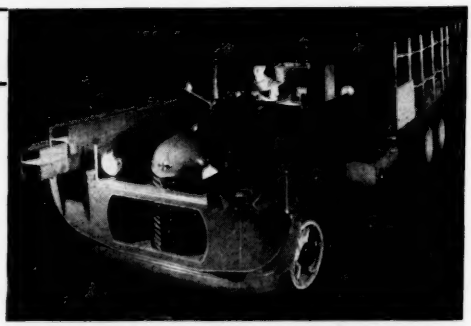


Where can we get it?

For next-door steel service, call your nearest Ryerson plant or office. The nationwide network of Ryerson plants brings steel stocks within short shipping distance of almost any delivery point. As an added convenience for steel buyers, Ryerson maintains sales offices in many cities, connected by direct wire to a neighboring plant.

When can we get it?

When the steel you need is on hand, you get delivery promptly from Ryerson—24-hour service in emergencies. If your requirements are not immediately available, we may be able to suggest workable alternates. We will certainly do our best. And remember, our stocks turn over quickly. We may have kinds and sizes tomorrow that are out of stock today.



So call our nearest plant or office when you need steel. We will be glad to work with you.

Joseph T. Ryerson & Son, Inc. Steel-Service Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.

PRINCIPAL PRODUCTS:

BARS—Carbon & alloy, hot rolled & cold fin., reinforcing
STRUCTURALS—I beams, H beams, channels, angles
PLATES—Sheared & U. M. . Inland 4-Way Floor Plate
SHEETS—Many types
TUBING—Seamless & welded mechanical & boiler tubes
STAINLESS — Allegheny sheets, plates, bars, tubes, etc.
BABBITT—bearing metal
MACHINERY & TOOLS—for metal fabrication

RYERSON STEEL

"Give us the tools . . ."

What Are *YOUR* Chances If There Are No Profits?

Since the November 2 election there has been a dazzling variety of plans to have the government do more and more things and spend more and more money. But there is almost no variety in the plans which are suggested to raise the money.

"Pay for it by taxing profits," is the standard refrain. Slap on an "excess" profits tax. Boost the corporations' income tax rate.

Well – why not? Haven't the corporations been making so much money that a big chunk of it can be turned over to the government spenders without hurting anybody?

The answer is no!

How high profits should be can be debated endlessly. Some people claim that 1948 corporation profits, which will amount to about $20 billion, are too high. They emphasize the fact that profits are larger in relation to investment than they were a few years ago. Other people think profits are low. They stress the fact that profits are not much larger in relation to sales than they have been historically. Both sides agree that in some individual cases profits have been too high, as in others they have been too low or non-existent.

But if we cut the total volume of profits drastically, we shall do so at our national peril.

There is no room for debate about that. For we shall choke off the crucially important job of building new plants and equipment for our industries. Squeeze hard enough, and America will go the way of Britain – down the long and painful skids of industrial decline. Widespread unemployment, especially among our industrial workers who produce new plants and equipment, will mark the dreary way. Here is a fact which the President, the Congress, the C.I.O., and all of us have a real reason to remember:

Almost two-thirds of all profits today are going to rebuild and improve plants and equipment.

More than $13 billion of this year's profits are being plowed back. They are going – as a large proportion of profits have always gone – to buy for workers better tools to work with, better surroundings in which to work. They are making possible better products, and more of them, for all of us.

The figures below show how companies have put more and more profit-dollars and a larger share of their profits to work in the business:

YEAR	PROFITS REINVESTED	% OF TOTAL PROFITS
1929	$2.6 billion	31%
1939	1.2 "	24%
1943	5.9 "	57%
1944	5.2 "	53%
1945	4.2 "	47%
1946	6.9 "	55%
1947	11.2 "	62%
1948 est.	13.0 "	65%

continued on next page

The record shows that each of us is the real beneficiary of this plowing back of profits.

Every American has benefited from these profits. Each dollar that business has put into its plants and equipment in the last thirty years has increased our yearly production by 35 cents.

This re-investment of profits has helped make possible a 75% increase in living standards since 1919.

It has helped increase wages from an average 48 cents an hour in 1919 to $1.36 today. Allowing for higher prices, that increase means that an hour's work today will buy twice as much as it did thirty years ago.

Why must business retain these billions of profits to improve its plants and equipment? Why must it plow back more and more? *The reason is that business already is caught in a tax squeeze.*

Federal taxes alone take at least thirty-eight of each one hundred dollars a company earns. Then, if the company pays out to its stockholders any part of what is left as dividends, the federal personal income taxes of the stockholders may take up to 77% of those dividends. Under these conditions, so few people are willing to invest in industry that the stock market is stagnant. Companies can not raise in that market the money they need for improvements.

The result: business must rely more and more on plowed-back profits to pay for new plants and equipment.

We know that everywhere in industry new and better ways of producing goods are standing ready for use. The previous editorial in this series mentioned some of them. We know, too, that depression and war put our industries far behind schedule – as much as $100 billion behind – in getting the new tools they should have had to keep themselves in first-class shape. McGraw-Hill is now completing a survey of industry that will measure these needs. The results will be published in this editorial series. We know already that in 1949 alone industry will need $18 billion or more for this purpose.

And all but a small fraction of that sum must come from profits.

Our prosperity, our strength as a nation, our hopes for better living depend on our continuing to generate and to plow back a large volume of profits.

For that reason we should not thoughtlessly follow these people who propose to pay for any and all new government activities by saying simply, "Soak the corporations." There is no need to follow them. There are other ways of obtaining necessary funds.

First and foremost should be economy within the government itself. If its citizens must pay still higher taxes, then surely government should exercise rigid self-restraint, cutting out all but the most essential activities and expenses.

After economy should come consideration of a broader federal tax base.

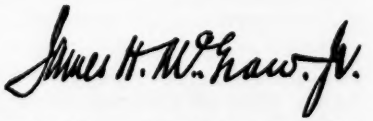
If these and other methods of raising money are inadequate and if taxes must take a bigger bite from business profits, two facts are clear. We should not adopt an "excess" profits tax with all of its complications and all of its corrupting effect on business. A moderate increase in the regular income tax on corporations is much less dangerous. *But even such an increase, if necessary, should be accompanied by special allowances for expansion and depreciation that will encourage companies to continue spending their earnings for new plant and equipment.* We all have a stake in that.

At this critical juncture in our history profits have a new and vastly more important role than they have ever had. In unprecedented degree they are the drive behind our present prosperity and the key to a better, stronger future.

Give profits the axe and the blow does not stop there.

It cuts into the employment, the prosperity and the strength of our nation.

Everyone of us has a stake in how the President and Congress handle taxes on profits – and now is the time to remind them of that stake.



President, McGraw-Hill Publishing Company, Inc.

JANUARY, 1949

Food Industries

Save by Better Materials Handling

In the food plant, as in other factories, one of the ways to cut costs quickest and deepest is to mechanize the handling of materials. Many food processors are doing much in this direction, particularly with the aid of power-driven lift trucks and conveyors. But few have gone all-out. And for those who have, new opportunities are presenting themselves in the form of specialized equipment.

The first step in cutting materials handling costs, however, is to study your operations and determine where unnecessary handling is involved. It is quite revealing, and usually a bit shocking, to draw a step-by-step chart of the movement of things in your plant. It is revealing because the chart usually shows a tremendous amount of time and labor involved in moving things around. The shock comes from the discovery that during many of the movements the material is merely being put out of the way or brought back after having been put away.

With this comprehensive chart before you, study the movements and see how many can be eliminated. Sometimes procedures can be shifted a little, or operations combined to eliminate handling of the material in between. In any event, boil the overall operation down as much as possible.

Having done this, calculate your savings and give yourself a pat on the back. Then plunge into the next phase of the cost-cutting procedure. This is to determine where horsepower can be substituted for manpower in moving materials. This is not to imply that absolutely all handling should be done by power. The frequency of handling, the volume, weight, and whether the man doing the job can accomplish it in "spare" time must be considered. So also must the cost of the power equipment needed. Here you may find that you need the help of a materials handling engineer.

The next phase of the job is to select the type of equipment best suited to various operations. Conveyors of one type or another usually are used where there is frequent movement of materials over the same route. Lift trucks often are efficient in carrying materials over nonfixed routes and, of course, where stacking is required, as in warehouses. Platform trucks and tractor-trailers fill still another niche in the efficient materials handling scheme.

While studying your materials handling operations, don't overlook the cost of loading and unloading trucks. Some carbonated beverage manufacturers have found that it costs more to put the load on a truck than it does to haul the load over the distribution route. That is why conveyors, hoists and lift trucks have been brought into increasing use in truck loading operations. And several companies have adopted the power-elevated end gate.

Don't overlook, either, the specialized materials handling equipment. Liquids, of course, are best handled by pumps, a special application of which is in handling liquid sugar at lower cost than dry sugar usually can be handled. Pneumatic and vacuum systems for "pumping" powdered dry materials, such as flour, offer decided advantages in many applications. Even small fish have been pumped from the holds of fishing boats.

The straddle truck is another special materials handling apparatus, widely used in some industries for picking up heavy timbers and pipe and carrying them from place to place. An unusual use of this equipment in the food field is found at Hawaiian-Pineapple Co. It transfers filled pineapple bins from field trucks to the processing line and returns the empties to the trucks.

Newest materials handling device for food processors is the electromagnet. One of these units takes tin cans, or metal-capped glass jars, from a pallet—layer by layer—and deposits them on a conveyor. The labor saving is reported to be tremendous, the number of dented cans is greatly reduced, and labeling operations speeded. Another electromagnetic unit loads and unloads retort crates.

It has been estimated that materials handling costs represent from one-fourth to one-third of total operating costs in factories in general. We don't know exactly what the figure would be for the average food plant, but it is high enough to make real savings possible.

—F. K. LAWLER, *Editor*

The Talk of the Industry

Advertising Pays Off on Quality

Large food manufacturers attending the annual meeting of Grocery Manufacturers of America were pleased no end by comments by A. C. Nielsen. He reported that major advertised brands established an all-time high, in 1948, in respect to high-velocity turnover in retail stores. These brands are running 54 percent faster than their less well-advertised competitors. Further, highly advertised brands, forced out of business by wartime shortages, already have regained their popularity, or better.

But don't let the "highly advertised" factor mislead you. Quality of product still is the most vital factor in achieving satisfactory sales records, in Mr Nielsen's opinion. One cannot but agree, because it is in general true that the food processors who do a lot of advertising also do an outstanding job of research, quality control and advanced food plant engineering.

Wages With the Fringe on Top

Labor's fourth-round wage demands will take a pattern somewhat at variance with past requests. Emphasis will be on fringe benefits more than on a large hourly-rate increase. Workers have been educated to want sick benefits, insurance and old-age pensions. And labor leaders think it relatively easy to get public support for increases in this form. So food processors will do well to study these fringe problems in advance, and particularly to calculate how much they mean in terms of increased wage costs.

It is likely, too, that management will have to base fourth-round increases on take-home pay for a 40-hour week. Overtime has become too costly.

As a major factor in the cost of living, food prices will have a lot to do with the size of labor's demands. Not only homemakers, but businessmen, will owe this industry a debt of gratitude if the price of eats continues to drop.

Sanitary Humidity

According to research at the University of Chicago, a relative humidity of 50 percent promises to become a weapon against bacteria and viruses. In tests with rats, influenza virus was atomized into the air which the animals breathed. The amount of virus that killed 100 percent of the rats at relative humidities of 30 and 80 percent, killed only 22.5 percent of the animals at a relative humidity of 50 percent. Tests also showed that the 50 percent r.h. was unhealthy for type I pneumonia germs, staphylococci and streptococci.

Maybe there is something in these findings for food processors who want to maintain the most sanitary conditions in their plants.

Grandfather Food

There may be 18,000,000 aged people in the United States by 1975, compared to 11,000,000 at present. The proportion of persons of 65 or older has risen steadily from 3 percent in 1870 to 7.5 percent in 1947, the National Industrial Conference Board reports.

So maybe it is time for more food processors to arm their technologists with the ideal dietary requirements of grandfathers and tell them to come up with special products for that market. Borden has developed products of this type.

Baby food may be suitable for the old and infirm, but think what it does to grandpa's pride to eat the stuff. Certainly there would be a demand for any special foods which would promise old people a little longer stay on this tumultuous earth.

Conflicting Ideas on Exports

Compared with the past few years, Europe in the next three years may buy less food from the United States and Canada according to the Food and Agricultural Organization of the United Nations. Secretary Sawyer is of similar mind, but he apparently is influenced by a desire to keep more food at home and thereby push prices down farther. Secretary Brannan looks at it from the opposite direction, desiring to ship more food abroad to help maintain U. S. farm prices at support levels. On Brannan's side is the Commodity Credit Corp., which hopes to send large quantities of grain overseas. And the government also is making a move to set up the previously neglected international agreement to provide more of an outlet for wheat.

Food processors should know soon which way the cat will jump and what the effect will be on the domestic supply and prices of raw materials.

Hors d'Oeuvres

■ A bride in Ohio, according to the *Country Gentleman*, completely stacked her kitchen with staples for $26.36. Seems like someone wasn't too sure this thing was going to last.

■ A new song and a new dance step are said to be based on the "natural bounce of a good ripe cranberry." Anyone want to try a rhythm on the natural glide of a good raw oyster?

■ Incidently, Public Health Service reports that "there are no visible signs by which a safe oyster or clam may be identified." But, they add, "knowing the oyster's or clam's background helps." Of course, if you want to take a chance you can just keep on picking up with any old oyster or clam.

■ Butter people now agree to lifting the tax on oleo, but they'd ban yellow coloring—of oleo. Being strictly neutral (we like 'em all) doesn't blot out the memory of the early World War II lament: "Too little and too late."

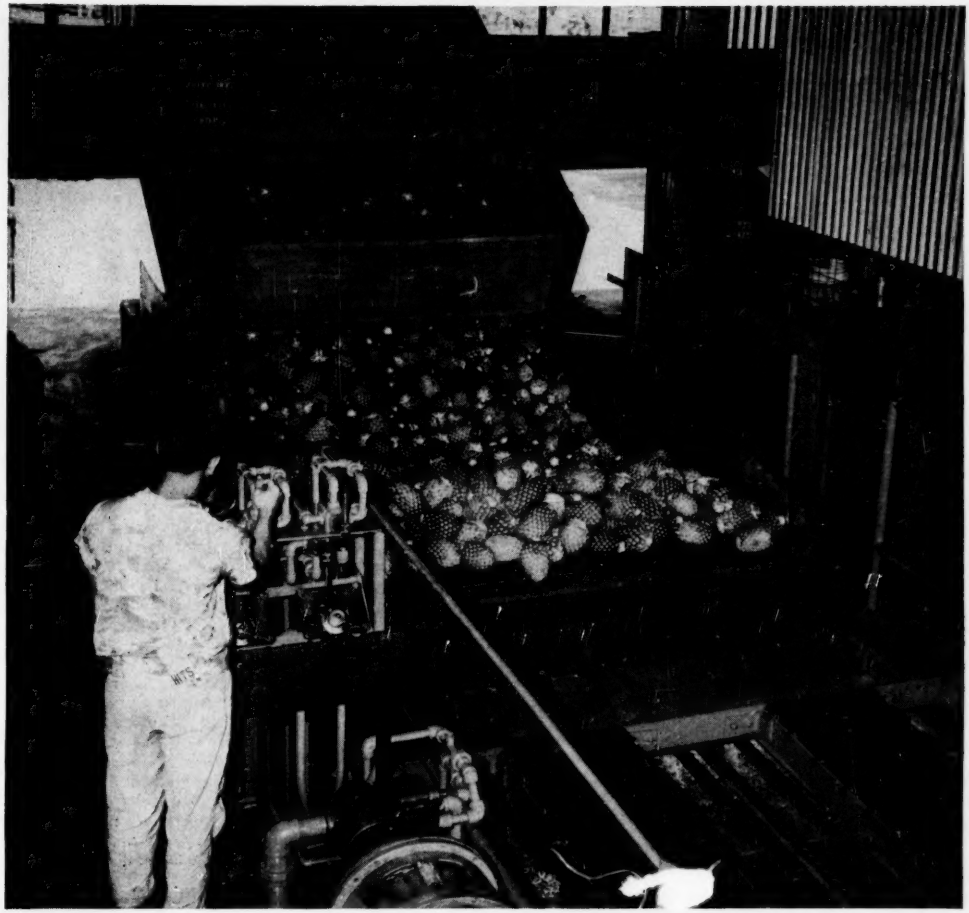
■ *Chicago Tribune* consumer panel reveals that, pound-wise, Chicago residents consume as much dog food as baby food. There are Republicans around who claim that some of these "residents" also vote.

■ Since politics has somehow crept in here, may we point out that during the presidential campaign this column predicted as follows: " . . . . . " What other column can make this claim?

■ So you thought the new look was confined to women's fashions. Turn the pages, brother, you aint seen nuthin yet.

■ We were told at the Packaging Institute's Forum that a package break of .003 in. will permit infestation. So if you see a hole in one of your wrappers, play it safe, get out the yardstick.

J.A.J.J.



FRUIT FLOWS IN as bin tilts, is conveyed to graders (lower right). Operator controls tilt, also conveyor speed.

Advanced Methods Bring Top Efficiency in Huge Cannery

Hawaiian Pineapple Co.'s 57½-acre plant in Honolulu can handle nearly 5 tons of fruit a minute. This striking performance—with close quality control—is a story of progressive materials handling and process engineering

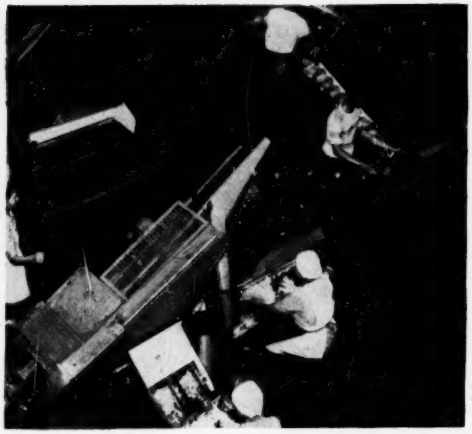
C. R. HAVIGHORST
Associate Editor "Food Industries"

Pineapples at the rate of 4¾ tons per minute have been delivered to the cannery process lines of the Hawaiian Pineapple Co., in Honolulu. Receiving this amount of fruit into one plant is, in itself, an outstanding accomplishment. Coordinating and controlling the equipment and operations to establish a continuous flow of high quality fruit through the plant is truly a mass-production engineering feat.

Operations on this scale have made this the largest fruit processing plant in the world, as well as one of the most modern.

Upon arrival in the factory yard, each bin of fruit is weighed on a truck scale. An experienced checker, stationed in a tower above the scales, estimates the average size of the pineapples in each bin. His information on size not only determines to which of the four sections of the yard a straddle truck (Ross-Carrier) will take the 7-ton bin of fruit but also provides the cannery with information helpful in determining the set up of

Second Special Article
On Hawaiian Pineapple Co.



GINACA machine and normal operating crew (shown) deliver 100 fruit cylinders per minute to packing tables.

TRIMMERS (right) remove bits of skin left by ginacas. Cylinders enter slicer (center) then go to packers.

the lines for each of the standard fruit sizes.

Following this sorting in the yard according to average fruit size, the bins are then taken by straddle trucks to the dumping lines. Each of the eight lines includes an hydraulic tilting mechanism and a set of gravity rollers. The hydraulic mechanism, controlled by a single operator, tilts up the bins in such a manner that the fruit rolls out on to a power-driven, variable-speed slat conveyor.

The operator then lowers and releases the empty bin, and it moves on gravity roller conveyors across the fruit receiving station. It is picked up by another straddle truck and placed in the yard to be returned to the fields. Each dumping line is able to handle from 12 to 15 bins of pineapples an hour.

A take-off at the end of each slat conveyor is used to obtain samples for inspection and tabulation by the fruit-quality department. The bins are numbered and accompanied by a manifest giving pertinent data on the field and section in which the pineapples were picked. This department therefore, is able to provide information on ripeness, condition, sugar-acid ratio, and pack recovery—furnishing a guide to the plantation for future harvesting in that area.

Conveyor Sizing Graders

From the slat conveyors, the fruit enters a system of special-conveyor sizing graders, dividing it into two sizes. Pineapples large enough in diameter to provide slices for No. 2½ cans are separated from those too small for this pack. The graders themselves, built by the company, consist of parallel 7-ft. steel shafts, of about 1 5/16-in. dia., wound with a spiral of 3/16 in. wire.

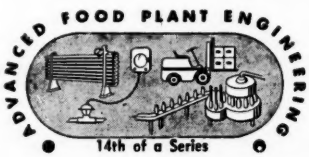
After entering the grader, each pineapple rides between a pair of the shafts. The fruit is propelled along as the shafts are rotated, since the spiral windings impart a worm gear action. Since it is desired that the smaller fruit will fall freely through the space between the shafts, rather than be forced through it, the left-hand shaft turns in a counter clockwise direction. The spiral winding on the left-hand shaft is, therefore, similar to a left-hand thread. Conversely, the right-hand shaft rotates in a clockwise direction and is wound with a right-hand spiral.

Must Space Fruit

Practice proved it necessary to separate the individual pineapples as they are conveyed across the graders in order that each fruit might ride freely on both shafts. This was accomplished by increasing the pitch of the spiral windings progressively toward the discharge ends of the grader shafts.

The smaller pineapples, which fall between the shafts, drop to a 48-in. conveyor belt that carries them to the cannery proper. No. 2½ pineapples are carried across the full length of the grader and fall on a second similar belt, and are likewise conveyed to the cannery.

While on these belts, the fruit is again weighed, this time by belt scales which show both the tonnage at a given moment and the cumulative total. The belts also carry the fruit through a series of high pressure water sprays where it is washed.



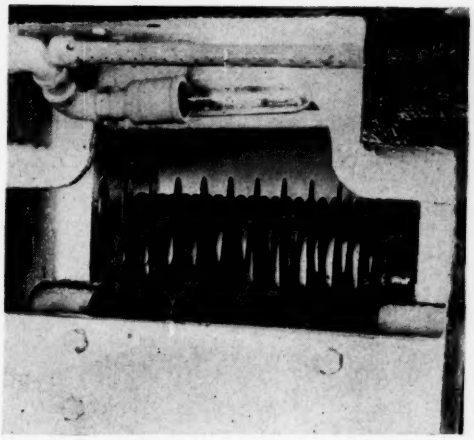
Distribution System

These two belts as stated, have delivered pineapples to the cannery at the rate of 4¾ tons per minute. The company had to find its own answer to the problem of distributing such a volume to its preparation lines.

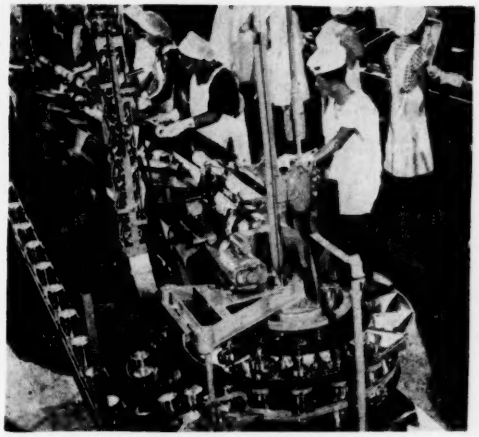
The two 48-in. belts enter the cannery and discharge the majority of the fruit—No. 2½ and No. 2 sizes—onto two transverse 30-in. distribution belts approximately at their midpoint. These distribution belts are each 500-ft. long and, laid side by side, they move in opposite directions across the feed ends of the preparation lines. Both top and bottom runs of the 30-in. belts carry fruit.

At the end of each run, the fruit is diverted to the other belt, and thus made to recirculate in the opposite direction. The bottom runs of the two distribution belts, therefore, provide a continuous path for the No. 2½ fruit, while the top runs perform the same function for that portion of the smaller pineapple which can provide slices for No. 2 cans.

Controlling the supply of fruit to the preparation lines is a delicate operation. An insufficient load on either or both of the distribution belts means idle workers and idle equipment. On the other hand, overloading the belts would not only bruise the fruit, but might easily cause a delay all along the lines until the congestion can be cleared. In addition, too frequent changes in the proportionate volume of



BLADES of rotating knives enter slots in slicer head. Inside, fruit cylinders are stopped momentarily for slicing.



CHUNK AND TIDBIT machine automatically feeds slices into cutter and fills specified quantity into cans.

fruit of the various sizes means unnecessary shifts of personnel and time-consuming machine adjustments.

Control Station

To avoid these expensive interruptions, the company has developed an intricate belt-control station from which the entire fruit dumping and distribution system can be synchronized.

Situated above, this control station affords a view of the 48 in. belts and the 30 in. transverse distribution belts, also permits a view of the devices for transferring the fruit from the former to the latter. Worked by a single operator the station is under the supervision of the superintendent of the fruit receiving department.

From his vantage point, the operator controls the volume of fruit delivered by the 48-in. belts by light signal or by direct speaker to the bin dumper operators. They, in turn, regulate the speed of the slat-conveyors, which control the rate of dumping. The speed of the 48 in. belts themselves (driven by variable-speed 10 to 30 hp. motors) may be adjusted from 90 to 300 fpm.

Another principle function of the belt operator is to keep the proper proportion between the feed and return distribution belt loads. This is accomplished by regulating the diversion devices which transfer the fruit from the 48 in. belts to the 30 in. distribution belts.

The fruit for the No. 2½ size cans is taken from the 48 in. belt to the lower return distribution belt by an adjustable deflector arm. When extended all the way across, this arm will divert all No. 2½ fruit onto the return belt.

In this position, a heavy load of fruit will be delivered only to one end of the cannery. To avoid such disproportionate supply, the control station operator normally leaves the deflection arm partly open. This allows some of the No. 2½ fruit to pass it and be diverted directly onto the feed distribution belt.

A similar balance must be maintained in the distribution of the smaller fruit. Here, however, an additional grading is necessary. Some of the fruit which fell through the first graders at the dumping stations is too small to provide slices for the No. 2 cans. Therefore, all fruit except the No. 2½ must pass through a second set of graders similar in construction to the first. Here, again, the smaller fruit falls between the shafts, though in this case it then may either be conveyed directly to the head of one of the three preparation lines which handle only No. 1 fruit, or be stored for short periods in surge bins.

The No. 2 fruit, having passed over the second grader, is taken by a short intermediate belt to its distribution belts. Here, a sliding diversion chute, positioned by the belt control operator, allows regulation of the proportion of No. 2 fruit between the feed and return belts.

Motor Control

At the nerve center of this sensitive network of belts, diversion mechanisms and graders, are the controls to 22 electric motors. These range from the 2 30-hp. units driving the 48 in. belts, to 10 ½-hp. motors driving V-belt deflectors which divert all the fruit from one of the 48 in. belts into the No. 1 grader.

Although most of the motors may be controlled either independently or in groups by the belt control operator, the two 15-hp. motors driving the distribution belts cannot be stopped (either intentionally or by failure of equipment) without immediately stopping the entire system. The overall stop is a valuable precaution against the continued delivery of fruit to inoperative distribution belts.

The "Ginaca"

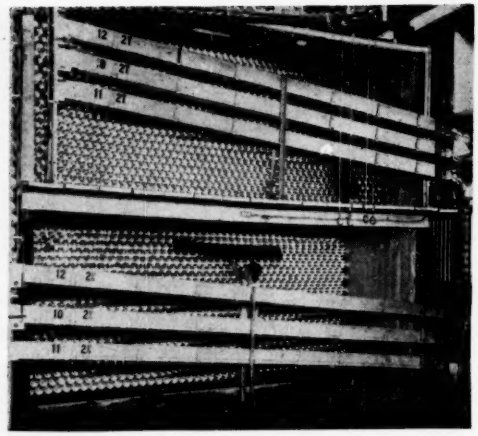
At the head of the preparation lines are the machines that really make possible the economical mass production of high-quality canned pineapple. These are the "ginacas," famous throughout the food industry for the speed with which they transform the thick skinned pineapple fresh from the fields into uniform, cored cylinders. Invented in 1913 by the Dole employee whose name they bear, today's improved models deliver approximately 100 cylinders a minute to the trimming and packing tables.

The ginacas handling No. 2½ and No. 2 sizes are supplied with fruit from the 30 in. distribution belts. Automatic deflection arms divert pineapples from the belts into chutes leading to each machine. The arms, operated by compressed air, are actuated by counter-weighted control valves near the top of each chute.

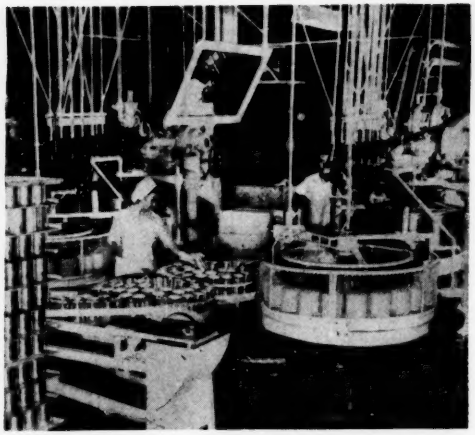
As a backlog of pineapple accumulates in a chute, its weight depresses the control valve. This, in turn, withdraws the deflection arm from the distribution belt, and no more fruit is diverted into the chute until the control valve is cleared of pineapples.

At each machine, an employee guides

See Fold-Out Picture-Flowsheet On Page 83



EMPTY CANS are stored in bins. Inspected and washed cans travel via chute directly to the packing tables.



FILLED cans of fruit are examined by an inspector as they are delivered to the prevacuumizer (right).

the pineapples as they roll from the chute onto the ginaca feed chain. At this point, the ginaca takes over. In the machine, the pineapple first goes through a centering head composed of a series of tension fingers and then passes directly over a revolving sizing knife that cuts a cylinder of given diameter from the center of the fruit. The cylinder is then carried past stationary knives that take a uniform cut from the butt and crown ends. Finally, the core is cut from the cylinder, and it then slides through a stainless steel chute to the trimming tables.

As the cylinder is cut from the fruit, the shell that remains is split in half. Each half, and the butt and crown cuts as well, pass through devices attached to the machine which remove the remaining edible portions of the fruit. This material, after being inspected on a tray at the side of the ginaca, is conveyed by belt to the juice department. Another belt carries the skins and ends to the by-products plant.

It is normal practice to place a ginaca handling No. 2½ fruit beside one handling No. 2 fruit. Either one is able to feed two trimming tables. By this arrangement, the lineup of ginacas with preparation tables may be quickly changed to meet a variation in the proportions of different-sized fruit to be processed.

Trimming and Packing

Each trimming table, about 20 ft. long, carries three conveyors. A belt on each side of the table brings the fruit to the trimmers. The trimmers inspect each cylinder and, with a specially designed knife, remove any bits of skin that remain. The operators place the trimmed fruit on a chain conveyor in the center of the table. Equipped with finger links, this conveyor delivers the cylinders to the slicing machines.

Here, as on most continuous production lines at which a number of workers perform the same operation on separate units, there is a problem in work distribution.

As a partial solution, the company uses a simple, adjustable timing device attached to, and actuated by, each side belt. At regular adjustable intervals, this device momentarily stops a single cylinder as it issues from the ginaca chute. Thus decelerated, this cylinder gathers behind it additional ones equal to the number of trimmers working from the belt. It is possible, thereby, to assign a specific cylinder in every group to each of the trimmers.

The trimmed cylinders are washed in a water spray at the end of the table, and then they enter the slicer. This machine consists of a heavy tubular holder slotted to receive a gang of rotating knives. The fruit cylinders are delivered into the holder by the center chain conveyor. Each cylinder then hestitates for a sufficient period to allow the gang of knives to rotate through the slotted holder, thereby slicing the pineapple. The chain then carries the fruit, still to all appearances a whole cylinder, out of the slicer and on to the packing table belt.

The majority of the 48 stainless steel packing tables are designed for inspecting, grading and packing the regular sliced items. The work load is distributed among the packers on the same principle that it is among the trimmers. Cylinders of fruit emerging from the slicer are grouped manually according to the number of girls at the table. Each packer inspects and grades the slices (from the cylinder for which she is responsible) and places them in the appropriate cans.

Pieces which cannot be packed as slices, because they have been overtrimmed or broken, continue on the belt to the end of the table, from which point they are conveyed to the crushed fruit department. Cans containing the slices are hand-trucked to the adjacent processing lines.

The trimming and packing tables are exceedingly flexible. It is but a matter of seconds to switch from one ginaca size to the other and to replace the slotted holders and gang of knives in the slicers to accommodate larger or smaller cylinders. Also, sizes of cans to be packed may be changed without interrupting the flow of fruit.

For a few items of pack, however, the advantage of specialized equipment outweighs that of flexibility. The new Dole frozen pineapple, for example, requires a table of its own—on which its chunks and syrup are filled and packaged.

Fruit too small for any sliced pack comes from three special ginacas and enters a double-length trimming table. From there it is conveyed to either the crushed fruit or juice department.

In the past year, the company has greatly simplified its method of cutting and filling pineapple chunks and tidbits. Since slices of conventional thickness provide fruit for the tidbit pack, the new tidbit machines can be supplied from the regular packing tables. Chunks, however, require a thicker slice, and this factor coupled with the increased efficiency of new equipment has justified tying several lines directly into automatic cutters and fillers.

Fruit destined for the chunk and tidbit packs is trimmed, washed, and sliced in the manner described above.

The slices are then inspected, and those meeting the standards for these packs are conveyed by belt to the feeding device on the cutting and filling machines. Here a specified number of slices is automatically pushed into a trough where a synchronized plunger forces them through fixed, radial knives that cut them into the desired number of segments.

The uniform segments then drop through small chutes into cans that are automatically positioned on a turntable. Empty cans are fed by conveyor directly into the turntable. The filled cans have their contents gently tamped before leaving the filler. They are then stacked on trays and hand-trucked to the nearby processing lines.

Processing Equipment

Most of the processing equipment in this plant—comprising pre-vacuumizers, syrupers, vacuum seamers, rotary cookers, and vertical coolers—is of the conventional kind well known in the canning industry. At the Dole cannery, however, the size of the installations and the volume of fruit to be processed have magnified the problems usually encountered in handling a food product.

The majority of the lines process the solid items of pack—slices, chunks and tidbits. At the head of each line, an inspector makes a final check of the cans for proper fill. They then pass into a pre-vacuumizer, where for 4 or 5 sec. they are subjected to a 25-in. vacuum. Pre-vacuumizing breaks down the air cells, thus enabling the syrup to penetrate the fruit and insuring a more uniform color in the product. After the syrup is added volumetrically, the cans are closed in vacuum double seamers and brought to a temperature of 190 deg. F. in rotary pressure cookers. Large vertical coolers, supplied with water from artesian wells, then rapidly reduce the temperature of the cans.

Processing lines for crushed pineapple and pineapple juice vary somewhat from the sliced, chunk, and tidbit lines.

In the early part of 1947, through the installation of dicing machines, the company made a marked improvement in the quality of its grocery-size crushed items. The sharpness and uniformity of the new cut not only make this product far more attractive in appearance, but also insure preservation of the natural texture of the fruit. At the same time, other new equipment was installed to produce a higher quality fine-cut and coarse-cut crushed pineapple for the pack used in No. 10 cans.

After the fruit destined for the crushed pack has been cut, it is pumped to steam-jacketed kettles, brought to 190 deg. F., and drained to the proper consistency. Syrup is added to the items requiring it, and the product is then filled hot into the cans. No further heating is necessary. The cans are immediately cooled after double seaming.

Beverage juice is extracted from the edible flesh of the pineapple by specially designed equipment. Having been heated to 140 deg. F., the juice passes through high-speed centrifuges to remove the coarser pulp particles. It is then filled in cans, which are then closed, brought to 190 deg. F., and cooled in the same manner as the solid pack.

At the present writing, however, only the juice pack is cooled sufficiently in the vertical coolers to allow immediate labeling and casing. The juice cans, consequently, may be conveyed by belt directly to the labeling and casing lines, while the other items of pack, for which heat transfer is slower, must be allowed more time to cool. This is done by storing the cans for the required length of time on the cooling room floor.

These cans are automatically filled on wooden trays at the discharge ends of the coolers. The trays themselves are then stacked by an electric hoist and moved by a hydraulic ram to a loading slot. From here a gasoline-electric lift truck takes them to designated sections of the adjacent cooling room, where they remain until properly cooled.

When the temperature of the cans has fallen to about 95 deg. F., the trays are loaded on small cars and pulled by industrial tractors in trains of ten cars to the labeling and casing lines.

Facilities and Location

Plant area of the Hawaiian Pineapple Co. covers 57½ acres in the industrial section of Honolulu. All the facilities needed to receive, process and warehouse the company's pineapple crop, and, in addition, the central research laboratories and the organization's general offices, are located here.

Electricity is the principal source of power for the operation and maintenance of these facilities. During the peak summer season, the kilowatt demand has risen to 3320. And steam is provided by boilers with a peak load of 130,000 lb. per hour.

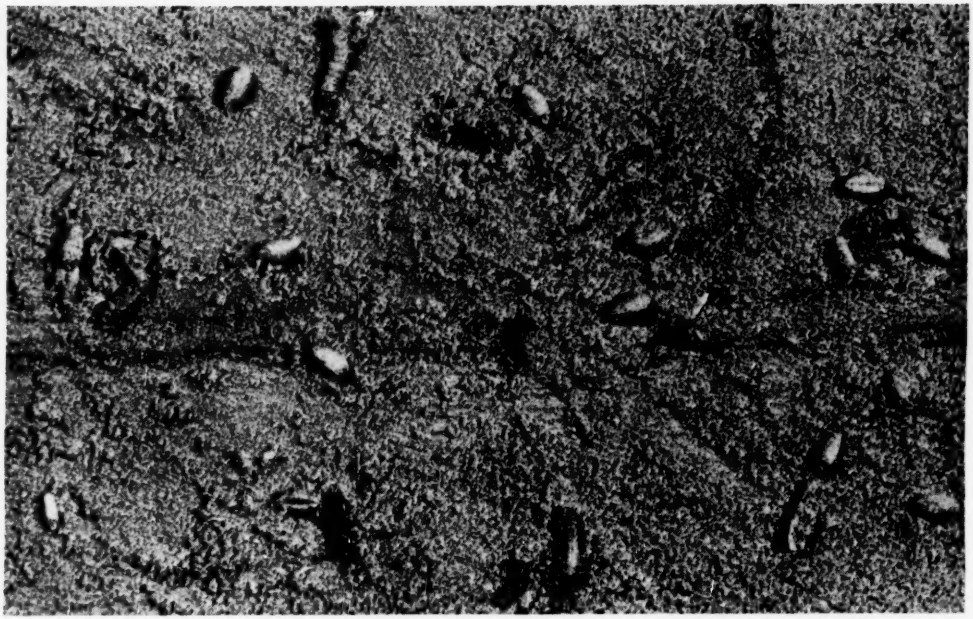
Some operations require compressed air or vacuum. Four air compressors, having a total displacement of 2200 cu.ft./min., and four vacuum pumps with a total displacement of 9,140 cu.ft./min., supply most of these requirements from a central compressor room. Where unavoidable, separate compressors are located near the operations that need them.

Water used in the factory, laboratories, and offices is drawn both from the company's own artesian wells and the local public system. Consumption has run as high as 7.32 mgd. during the peak summer season.

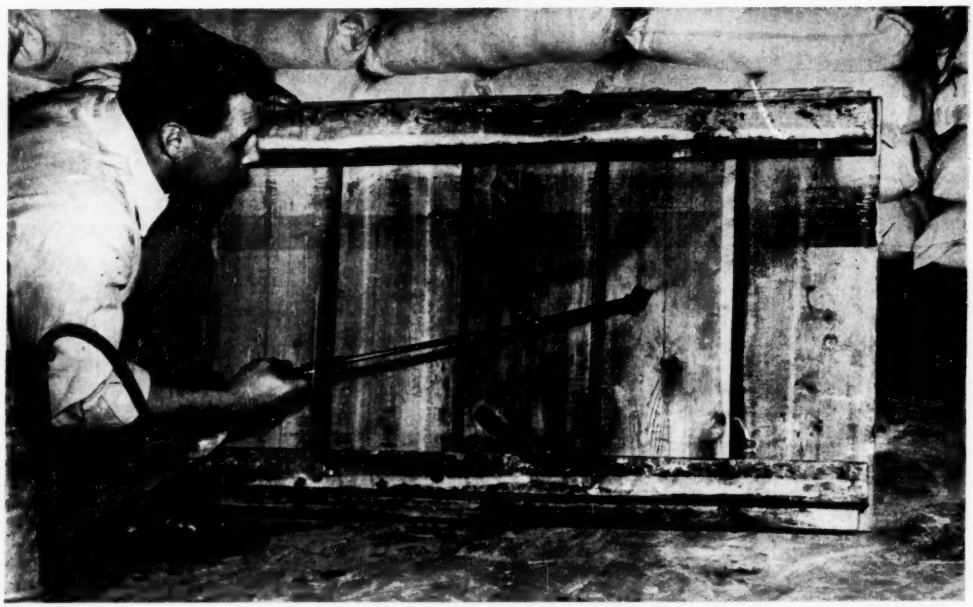
Being on the main arterial highway of the Island of Oahu and less than a mile from the wharves, the company's plant is stategically situated to ship its finished product and to receive both mainland freight and fresh fruit from the plantations with maximum economy.

Editor's Note: Initial article on this company's operations, "Control of Quality and Costs Begins In the Field," appeared on page 71 *of December* FOOD INDUSTRIES. *Third article, to be published in February, will detail integrated operations, including boxing and shipping, the manufacture of such byproducts as cattle feed, and the recovery of citric acid and sugar.*

TRAYS are taken from the cooling room on trains of small cars. At labeling and casing lines, hydraulic hoist lifts two stacks of trays from the cars.



Bug-Ridden Warehouse Cleaned Up . . .



. . . When New Insecticide Was Sprayed

New combination spray provides immediate lethal action and long-lasting residual protection against many types of insects

L. C. McALISTER, JR.
Applied Research Laboratory
U. S. Industrial Chemicals, Inc.
Baltimore, Maryland

A recent application of Pyrenone* in a large eastern warehouse has demonstrated its insecticidal effectiveness for use in connection with food storage. Emulsifiable Pyrenone 10-1 (T-143) was used in diluted emulsion —only 10 gal. of Pyrenone being required for sufficient emulsion to spray more than 100,000 cu. ft. of warehouse.

Three floors of the warehouse are used for storage of flour and other food products. Until last summer, shipments of flour had been moved out of the house so promptly that, although insect infestation was heavy, its effect on the flour was not noticeable.

Last summer, however, movement of flour began to lag. When, in the course of a routine inspection in July, inspectors from the local health department found large numbers of insects crawling on the bags, they placed "Retained" tags on all the flour and gave the management five days in which to clean up the infestation.

Believing that fumigation was the only solution, the management called for assistance from the rodent specialist who regularly services the warehouse for rat control. The specialist's proposal to spray the flour storage area was accepted.

The warehouse was sprayed during the night of July 19. Forty gallons of emulsifiable Pyrenone emulsion covered approximately 100,000 cu. ft. Rate of application was about 3 ml. per sq. ft.

The health inspectors returned on July 20, and carefully examined the flour and storage areas. They were able to find only three or four flour beetles still alive—these in a moribund condition and dead the next day. The spraying had been so completely effective that all the flour was immediately released.

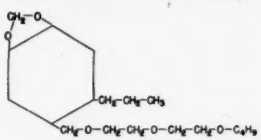
Thousands of dead insects of all types were found on the floor and in cracks between the floors and walls. Confused flour beetles predominated in number. However, cadelles, several species of weevils, grain beetles, grain borers, moths and the yellow meal worm, both larvae and adults, were present in quantity.

Had fumigation been undertaken, the cost would have been more than twice that for spraying, and the warehouse would have been completely closed for at least 24 hr.

Approximately three-and-one-half weeks after application of the spray, the warehouse was examined and no living insects found.

New Pyrethrum Combinations

Development of new organic chemicals and their combination with pyrethrum to produce Pyrenone has removed former disadvantages of pyrethrum insecticides—the relatively high cost and the failure to give residual protection. It has broadened the field in which food industries can secure effective insect control without hazards and without the need for special precautions.



Piperonyl Butoxide . . .

is a recently introduced synthetic organic insecticide developed by U. S. Industrial Chemicals, Inc. Its full chemical name is 3,4-methylene-dioxy-6-propylbenzyl (butyl) diethylene glycol ether. Commercially supplied, it consists of this chemical and other substances so closely related in composition, physical and chemical behaviour and insecticidal activity as to make further separation unnecessary. In the strict sense, piperonyl butoxide is not a pure chemical.

The material is purified by vacuum distillation, assuring a high degree of uniformity. It is an effective insecticide when used alone, but is practically always used in combination with pyrethrum extract. The combination is effective through independent as well as synergistic activity of the components.

The chemical with which the pyrethrum extract is combined is called, by agreement with the Production & Marketing Administration, butylearbityl 6-propyl piperonyl ether. This light, straw-colored liquid is soluble in alcohol, benzol, petroleum, hydrocarbons and dichlordifluoromethane. Although not soluble in water, it may be readily emulsified in water with suitable emulsifying agents.

Piperonyl butoxide is an effective insecticide when used alone. As used in the Pyrenone combination with pyrethrum extract, it is a superior contact insecticide and highly effective as a surface deposit or residual application. Even more remarkable, perhaps, is the extent to which the combinations appear to stabilize the supposedly unstable pyrethrum, making possible a long-lasting residual protection from single applications of concentrated sprays.

Ingestion by the insect is not necessary—the insecticide kills by contact or by absorption. Insects commonly affecting the food industries, particularly cockroaches, are not repelled by it.

Both piperonyl butoxide and pyrethrum are recognized as non-toxic and non-hazardous. The toxology of the compound and the Pyrenone concentrates has been studied with an unusual degree of thoroughness. Results of a series of acute oral experiments on laboratory animals extending over two years fully justify the conclusion that the concentrates contribute no toxocological hazards.

Important as safety is, practical necessity dictates that it be combined with effectiveness and reasonable economy. Although Pyrenones, like all known insecticide materials, have limitations, their effectiveness in good plant sanitation leaves little to be desired. Properly compounded and applied, they control not only flies, mosquitoes, roaches, ants and other customary pests, but also are unusually effective against the mites and skippers which pester meat packers and cheese plant operators. The spectacular overnight cleanup of the flour storage warehouse shows how completely the grain-destroying insects infesting flour feed and cereals may be destroyed.

Costs Compensated

In surface deposits or residual sprays, Pyrenones used in much lower rates of application than usually recommended are as effective as any other insecticides. They are faster acting, as evidenced by the fact that insects contacted directly or those crawling on treated surfaces are paralyzed in a matter of minutes.

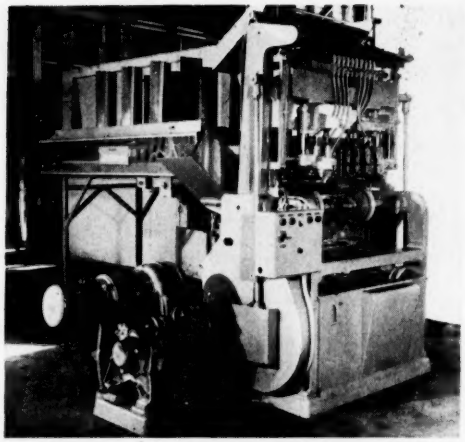
As compared with the chlorinated hydrocarbons, Pyrenones are inherently more expensive. This is compensated in part by their effectiveness at higher dilutions and in full by their safety factor. They are far less expensive than pyrethrum, as well as more effective and more stable.

Pyrenones can be applied as: (1) Space treatment for rapid (but not long-lasting) effectiveness, from conventional sprayers and from liquefied-gas or thermal aerosols; (2) long-lasting surface deposits on areas where insects crawl or rest, and (3) powder or dust in inaccessible places, for long-lasting effectiveness.

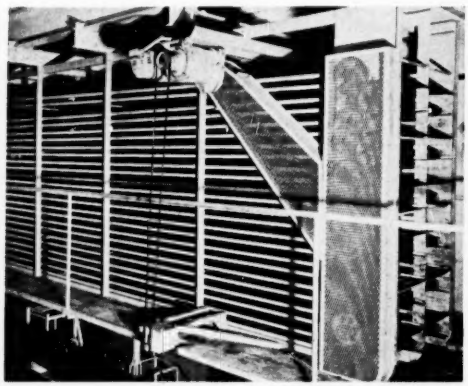
* Registered trade-mark of U. S. Industrial Chemicals, Inc., Pyrenone is a combination of the relatively new insecticide piperonyl butoxide and pyrethrum extract.

Variable-Speed Drives Solve Processing Problems In Food Plants

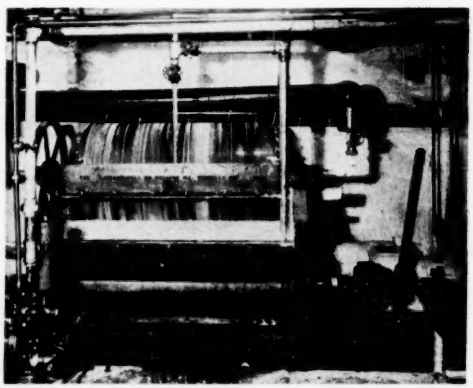
Motor units whose speeds are instantly and infinitely variable are widely used to regulate rate of flow through processing and packaging. Better quality, greater output, and higher efficiency result



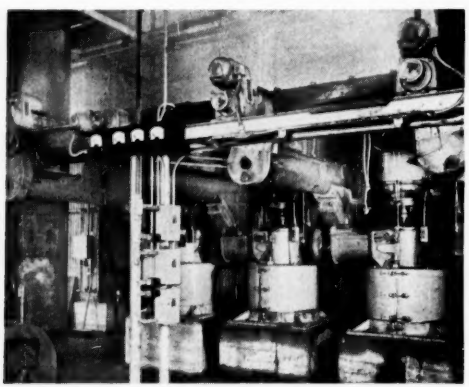
BOX PRODUCTION can be synchronized with packing demand (6 to 12 boxes per minute) by setting control dial of I-V motor driving this automatic box maker.



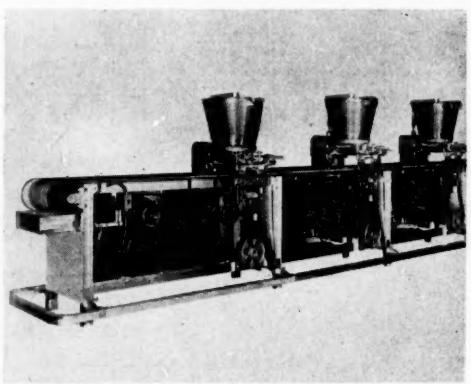
DOUGHNUT COOLER in Van de Kamp bakery, Los Angeles, is powered by variable-speed drive unit, which can vary capacity; maximum is 700 dozen per hour.



LARD is cooled on variable-speed chilled roll by Sterling Meat Co., Vernon, Calif. Variations in amount and temperature necessitate changes in drum speed.



COPRA is fed to mills by variable-speed conveyors at Vegetable Oil Products Co., Wilmington, Calif. Mill speed varies according to size of pieces and cycle of expellers.



ICING MACHINE for cake and cookie bakeries has four variable-speed drives. One motor adjusts belt speed while others control applications of icing.

CARL E. JOHNSON

President, Sterling Electric Motors, Inc., Los Angeles, Calif.

Instantly and infinitely variable-speed electric motor units are helping to improve efficiency, production output and quality in food processing plants. They are used to advantage in virtually all types of food factories, being applied to such highly divergent lines as bakery products, beverages, canned foods, dairy products, edible oils and seafoods.

There probably is no other industry in which variables are so numerous or so difficult to overcome. An almost endless number of production problems are posed by such variations as the size, shape, quality and moisture content of raw materials; temperature and humidity effects; sanitary regulations; and the production requirements imposed by human and mechanical limitations.

Consequently, close control over the rates of flow of processing is important. That is why instantly and infinitely variable-speed motors are so widely utilized to regulate the speed of machines and conveyors. In the following resume of these applications are many examples of how the ability to vary rate of flow through the process and the packaging operation works to the economic advantage of the food processor.

Many Variables in Baking

In such food plants as bakeries, different items are processed and handled on the same machines and conveyors. Many bakery items are produced only for special events, such as conventions, parties and weddings; or for annual or more frequent religious and other holidays; or—as a matter of management decision—only every other day, once a week, or monthly. Whatever the frequency of production, each product requires its own particular routine, a cycle that may have to vary because of changeable factors. Yet the resulting product must be uniformly and efficiently processed for profitable sale on a small-margin basis.

Naturally, there is great variance in the production flow time of such items as doughnuts, bread, cake, pies, cookies and other items produced by modern bakeries, particularly the larger ones. In many instances, a number of similar but quite different items must be processed on a single machine or line.

To accommodate this variety of products, and to adjust such multi-purpose equipment to the fine process shadings required for each item, flexibility of motor power is essential.

Bread and cake dough dividers, in the plants of such concerns as Van de Kamp in Los Angeles, operate at a wide range of speeds that vary in accordance with the size, weight and texture of the loaf or cake being produced. Or a different speed selection may have to be made to synchronize the divider with the proofer, or to adjust for different kneading and relaxing time peculiar to each type of mix.

These mixture peculiarities, too, have variables. Changes in atmospheric conditions—humidity and room temperature—and slight but unavoidable variations in the ingredients themselves, all require adjustments in the processing flow rates.

Even bakery pan washers need to be sufficiently flexible in their operating speed ranges that they will accommodate pans that vary in size, shape, condition and the turn-around time that can be allowed. The number of personnel available to feed-in, inspect, finish and take away pans from the washers and drying ovens likewise imposes changes in operating speed.

Doughnuts are a good example of a product that frequently demands change-of-pace control over the rate of flow during processing.

In the Van de Kamp plant, where a variety of doughnut types and sizes are produced, the rate of production ranges from 200 to 350 dozen per hour on the same equipment. The rate, whatever it is for each type, is achieved by adjusting the r.p.m. of the motors driving the various machines and conveyors.

Large sizes may go through the fryers at 200 to 250 dozen per hour, while the same equipment, at another hour or day, will turn out 300 to 350 dozen an hour of smaller sizes. But size is not the only factor affecting flow rate. Atmospheric temperature and humidity also influence it. They dictate the time each size requires, from hour-to-hour, on the cooling belts.

Large sizes, which also require more time to fry, must travel slower on the cooling belt than smaller sizes. All must run slower on warm, summer days than in winter because of higher room temperature. And the spacing of larger sizes must be greater to permit greater circulation of air around each doughnut.

Doughnuts of all types and sizes have to run slower to cool more if they are to be sugared. Otherwise, their warmth will melt the coating.

In icing cakes, cookies and a variety of other pastry items, the operating speeds of both the icing machine and the conveyor which passes the product under it vary for each item. The proper speeds depend upon the type and amount of icing being applied, and the rate of flow as required to meet production schedules. Even variations in the sugar content of icing will call for a different operating speed on the same type and size of product.

Dairy Plant Problems

In dairy plants the I-V (infinitely variable) motor units also are proving of value in solving production flow problems. While almost as numerous and varied as in bakeries, these problems are quite different in nature. In fresh milk plants, such as those of the Carnation Co. and Borden Farm Products in Los Angeles, the variable-speed units drive pumps which transfer milk from storage tanks, pump it through the short-time, high-temperature pasteurizers, and operate ice cream mixing and packaging machines, fruit feeders, bottle washers and other types of equipment.

In the Carnation plant, the washers clean and sterilize bottles of several sizes and shapes at production rates ranging from 65 to 96 bottles per minute. Through the infinitely variable speed range of the motor units which power the washers, the rate of delivery of bottles to the filling machines is adjusted to the filling rate. This rate depends upon the volume of fluid milk being received from hour to hour, the number of operators available, and the quantities to be processed for different hours, days or events.

Short-time high-temperature pasteurizing flow rates are governed by state laws and city ordinances which specify that the fluid be brought to a certain temperature and held there for a specified time. Gages and flow control valves which fix this cycle are checked, set and sealed periodically by government inspectors. I-V motor units can be set and sealed and will then accurately and consistently hold the rate of flow.

Finely shaded rates of production of ice cream freezing and packaging machines, too, are more easily attained with I-V motor units. Rates of flow in a typical plant vary from 300 to 450 gal. per hour, depending upon the ice cream being produced, the texture desired, consistency of a fruit mix being added to the product, the number and skill of operators available, and the number of freezers which are operating.

Throughout the modern dairy plant the needs for infinitely variable and instantly controllable flow speed are numerous and exacting. Efficiency demands maximum production consistent with intended capacity. But consistency of the materials handled varies, and processes differ. Excessive speed

in processing, even if permitted by law, may have a detrimental effect on the product. Pumping speeds, for example, must be controlled closely to avoid over-agitation and aeration.

Closer Control in Canning

Canneries are finding numerous uses for this power unit and its better control over processing and packaging. In plants such as that of Hunt Foods, Inc., on the West Coast, the canning of peaches provides a typical example of the need for infinitely variable, instantly adjusted speed of machines and lines.

Peaches in different batches vary in size and in the thickness and texture of their skins. Such differences necessitate variations in the time each batch remains in the lye peeling bath to remove the skin.

After peaches are prepared, it is essential that exact control of their flow over conveyors be maintained and properly synchronized with the rate of operation of the hand-pack filling machines. Sirup is added to the filled cans by automatic machines. Improperly timed flow at this point will cause over- or under-filling, necessitating correction by time-consuming and costly hand operation.

Hunt Foods' mechanical crews are constantly at work on line changes, replacement and new installations. And they use an infinitely variable speed motor unit in testing such installations to establish the optimum operating speed. If the rate established is limited to two, three or four variations, a motor with these speed variations is installed, and the more flexible I-V unit is moved to another machine or line where its greater range is required.

Regulating Oil Processes

Extraction of oils from copra, soybeans, flaxseed, cottonseed and other highly divergent types of raw materials requires exact control over the rates of processing, as this is an important profit and loss factor. In the plants of such concerns as Vegetable Oil Products Co., Wilmington, Calif.—which processes all of the above mentioned raw materials—synchronization of the speed of conveyors and mills is a critical matter. Conveyors having feeder screws of 2/3 pitch and 9-in. diameter, which turn at speeds ranging from 6.7 to 13.4 r.p.m., feed raw materials from storage bins to hammer mills and expellers.

Variations in the size, structure and other characteristics of the several materials processed call for variations in the speeds of conveyors and mills and expellers. If mills are overloaded by improper synchronization, they do not crush properly and expellers cannot extract the maximum amount of oil. If underloaded, production volume drops to less profitable operating levels.

In this firm's plant, installation of I-V motor units on 24-in., heavy-duty expellers increased production approximately 25 percent.

Meat and Fish Plants

At the Sterling Meat Co. plant in Los Angeles, better timing of such machines as a lard roll has been achieved with an I-V motor unit. To properly cool and congeal lard, the cooling cylinder speed has to be varied in accordance with the changing temperature and volume of lard oil flowing onto the rotating cooling cylinder. The I-V motor unit provides this variability.

In fish processing plants, too, variations in the rates of flow have to be accurately controlled and frequently altered to meet a number of almost constantly changing conditions. Some are due to the variety of fish processed and variations in their sizes and the products derived. Other variations are due to mechanical and kindred limitations.

Flaking machines, and the conveyors and can fillers which take their output, involve a wide range of production flow speeds in fish processing plants. The need is imposed by the economic fact that this type of product is generally priced lower than solid packs, allowing smaller margins of cost and profit, yet fish pieces fed to flaking machines range from small scraps to fairly large chunks requiring more flaking time.

The ability to vary the speed of flaking machine operation in accordance with the type of input helps in keeping flaking costs at a profitable minimum. It is another instance where the I-V motor unit is proving of considerable value.

Fruit and Juice Processing

In processing citrus fruits, both for the fresh fruit market and beverage manufacture, variables in the fruit itself impose processing changes-of-pace readily obtainable through the use of I-V motor units.

At the Santa Paula Citrus Association's plant in Santa Paula, Calif., sorting-line and washer speeds have to vary virtually from moment to moment because of differences in the grades of fruit going through. Poorer grades, which require more sorting time, cause a slow-down of the operating speed of both the sorting belts and the washers which feed onto them.

Fruit received from some areas where a localized atmospheric condition may have increased soilage may require more washing time, a factor which also will necessitate a variation in processing flow time.

In citrus beverage plants, such as that of the Bireley's Division of General Foods Corp., at Los Angeles, infinitely variable speed motor units are cutting truck demurrage, compensating for changes in outside atmospheric temperature, adjusting flow to several container sizes and cooling times, and varying juicing machine speeds to coordinate with other process factors.

Fruit washing can be done at speeds ranging from 20 to 30 tons per hour, depending upon the condition of the fruit itself and the needs of the truck unloading line. If the number of arriving trucks threatens to prolong waiting into demurrage time, washing speed can be increased to the maximum unloading rate. Variations in the unloading and washing rates are equalized with maximum operating speeds of the juice extractor by adjusting the speeds of I-V motor units and by diversion of excessive inflow of fruit to storage bins.

In the manufacture of Bireley citrus juice concentrates, variations in the temperature of water from a cooling tower, which circulates through the cooling jackets of juice concentrators, are off-set by changing the speeds of I-V motor units driving pumps which force juice through the concentrators.

Juice concentrates are heated to 175 to 185 deg. F. during pasteurizing and are canned by two automatic machines which handle cans varying in size from 5½ to 46 oz. After filling and sealing, the cans are water-spray cooled at rates ranging from 15 to 90 cans per minute. The rate of cooling varies in accordance with the size of the can, viscosity of contents, and temperature of the water.

Regardless of the variables, the aim of the cooling line's operating speed is to deliver all cans to a refrigerated cooling room at a uniform temperature.

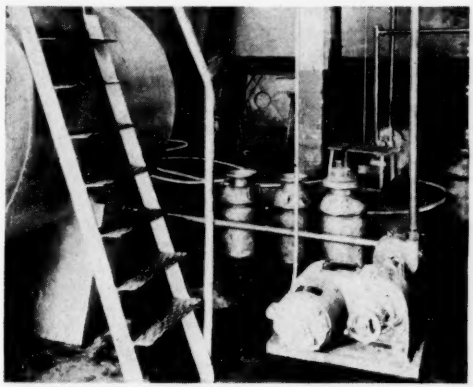
Because of the variables, it is necessary to maintain a fairly close control over the speed of such lines. This is done through frequent adjustment of the speed of I-V motor units which power both the can filling and cooling machines.

Advantages in Candy Plants

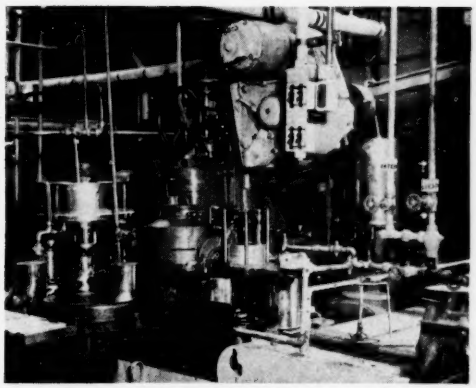
Candy manufacturing is another food process in which the ability to vary the speed of flow of raw materials and the manufacturing and packaging processes is second in importance only to full control over processing temperatures—as in baking.

Installation of I-V motor units in such plants as those of Walter A. Hewitt Candy Co., Los Angeles, and Edgar P. Lewis Candy Co., Malden,

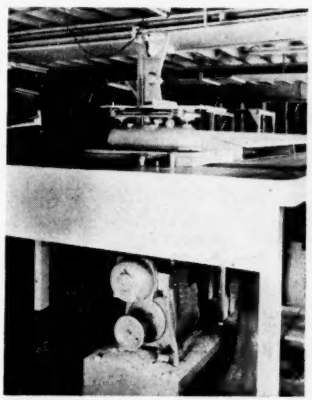
Five More Examples of Variable-Speed Drives at Work



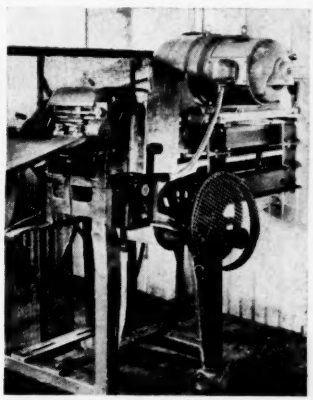
MILK PUMP at Borden Farm Products, Los Angeles, has variable-speed drive to control transfer of milk to pasteurizer and avoid excessive aeration.



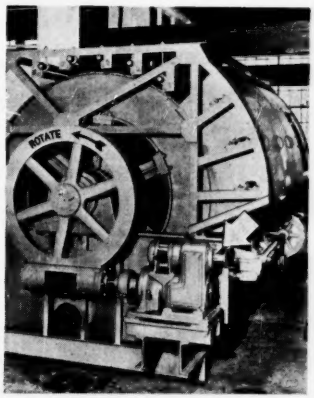
CAN FILLER and sealer in Bireley citrus concentrate plant, Los Angeles, have variable-speed motor unit. It adjusts line speed in accordance with variables.



CANDY PACKING line in Walter A. Hewitt Candy Co. plant in Los Angeles is woven-belt type, powered with a variable-speed motor unit. Variations in box size and speed of workers are compensated for.



CANDY CUTTING MACHINE with variable-speed drive in plant of Edgar P. Lewis Candy Co., Malden, Mass. I-V motor units provide finely shaded speed control required by different consistency and changing conditions.



SUGAR FILTER in plant of C. Brewer & Co., Honolulu, is powered with variable-speed motor unit because sugar content of "mud" being processed varies and conditions change at different seasons.

Mass., has effected favorable gains in quality control, maintenance of desired volume, and power-use efficiency.

At the Hewitt plants, I-V motor units provide precise control of conveyor belts, enrobers, continuous cutters, wrapping, packaging and boxing equipment and lines handling virtually all types of candies.

Continuous cutters offer a good example of what a flexible operating speed range does for candy makers. Cutting a wide variety of goods of greatly varied consistency, temperature and degree of stickiness requires extreme flexibility in the operating speed of both the cutters and the conveyors which take away the cut goods.

Sticky goods which have a tendency to lump can be fed slightly faster than the longitudinal travel speed of the cutter blades, a timing which achieves better separation and prevents lumping. Hard candies, on the other hand, can be run through at the same speed as the tangent velocity of the cutter roll blades, thereby assuring proper separation for this type of goods.

To achieve a clean break for chips, operation of the cutter at its maximum speed has been found best in the Hewitt plants. For pillows, where break-apart is not desired, cutter speed is slower. But small-size pillows are run through faster than larger ones, the exact speeds being adjusted to meet all of the variables encountered from batch to batch or hour to hour.

Cooling also requires very close control for maximum production efficiency. If the operating rate of a cooling belt is too fast, wrapping and packaging may be completed while sufficient warmth remains to cause sticking.

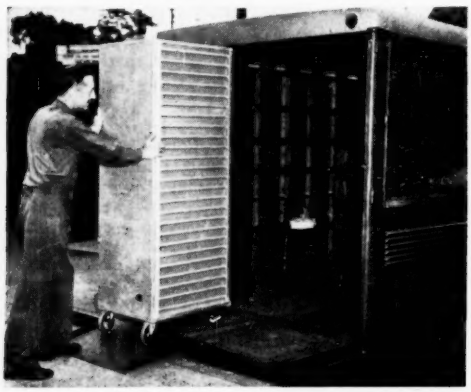
In the Hewitt plants, where I-V motor units have replaced cone and belt drives on older equipment, improvements in overcoming power and precision loss factors were credited to the new motors. That they require less space was also noted as a favorable point.

New Baked-Goods Shipping Cabinets Speed Deliveries

Clerk finds trays easier to handle. Customer sees appetizing display.

Packing is now simplified, improving upon . . .

. . . Old laborious box method



Truck loading is easier, eliminating . . .

. . . Awkward dollying and transfer of boxes

and "Double" as Display Shelves in Stores

Cabinets provide more space for merchandise and save labor by reducing handlings. Moreover, goods arrive in better condition

EUGENE J. SMAYDA, JR.
Vice-President in Charge of Operations, Smayda Home Bakery, Cleveland

Quicker packing and shipping of baked goods—with efficiencies not heretofore attained—have recently been achieved with the use of new, roomy, all-aluminum shipping cabinets at Smayda's Home Bakeries, Cleveland.

These cabinets, developed after nearly three years of experimentation, not only speed operations but have also been found superior to the old type shipping boxes because they—

- Afford more space for packing the baked goods,
- Cut down the handling of goods by about one-half,
- Deliver merchandise in better condition, and can be used for display,
- Minimize the amount of returned goods,
- Service more stores in less time and with less labor.

Formerly, all baked goods (except bread, which is still being delivered in wooden crates) were packed and shipped in galvanized boxes. These containers weighed 25 lb. and measured 28-in. long by 20-in. wide by 6-in. deep. Each box held two pans measuring 26-in. long by 18-in. wide.

The new cabinets weigh 105 lb., and they have an overall height of 69 in., width of 20½ in., and depth of 27½ in. They hold a total of 25 of the same size pans—12½ times as many as in each old type shipping box.

Previously, 100 of the old boxes, with a total of 200 baking pans, could be loaded onto each truck. Now, however, it is possible to load 25 of the new aluminum cabinets containing 300 pans of merchandise, thus increasing the capacity of the trucks 50 percent.

Number of Handlings Cut

Chief objections to the use of the old boxes were the many handlings required, the time lost, and the merchandise damaged. But through the use of the new cabinets, these disadvantages have now been overcome—in the bakery, on the trucks, and at the retail shops. Here is how:

In the bakery, pans are now taken out of the ovens and placed directly in cabinets upon shelves on 2½-in. centers. The cabinets, mounted on 5-in. rubber tire casters, are then rolled directly out to the shipping dock.

When the old shipping boxes were used, handling was much more complex. It took considerable time to remove the pans from the ovens, place them on bakery rack shelves, pack them into shipping boxes, stack ten boxes on a dolly, and carefully roll the dolly to the route truck. Dollying the boxes to or from the truck—whether at the bakery or at the store—was never easy. Sometimes some of the boxes slid from the stack and fell from the dolly, damaging the goods.

On the trucks, the cabinets have simplified loading and unloading operations in two ways: First, only 25 cabinets (instead of 100 boxes) are handled by the driver. Cabinets are loaded directly onto trucks and directly unloaded from them. Shipping boxes, on the other hand, had to be taken off dollies, loaded onto trucks, later unloaded from the trucks, and then stacked on dollies.

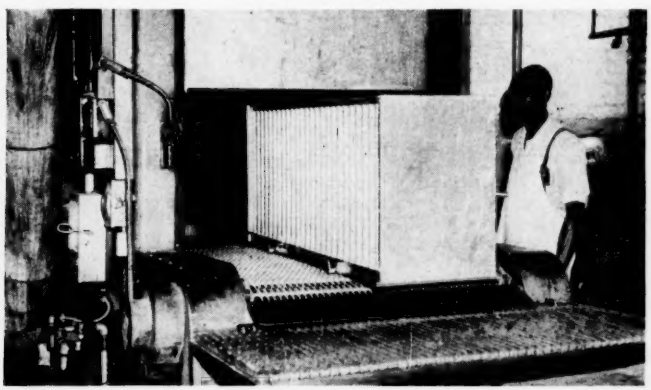
Second, the bakery has purchased new trucks, each equipped with an hydraulic end gate. This end gate can be lowered so that the cabinets may quickly be rolled over a curb and onto the end gate via a steel-plate ramp. Then the gate is raised into position so that the cabinet can be rolled onto the truck.

At the retail shop, cabinets are rolled off the truck and then rolled inside the store, where the pans of merchandise are removed only as they are needed. Previously, shipping boxes first had to be unloaded from the truck onto dollies, which in turn were rolled into the store. Boxes were then unloaded from the dollies.

Thus, handling at the stores has been decidedly simplified. And it is no longer necessary for women clerks to lift heavy shipping boxes in their search for different cakes, buns, pies, and rolls. Now, all the clerk does is open the cabinet door—and she has a full view of 25 pans of goods. Also, she can service buyers more rapidly.

Because the appearance of these cabinets emphasizes cleanliness and neatness, they serve, in addition, as attractive display units in retail shops.

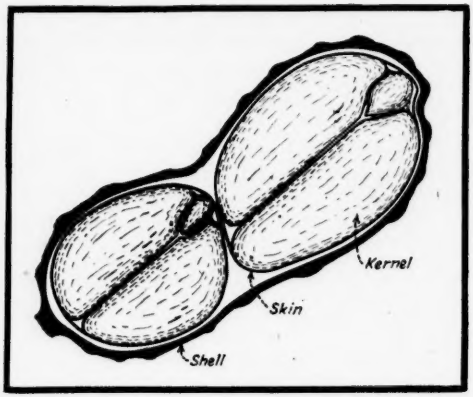
CLOSE-UP of truck end gate lowered to curb for transfer of cabinet to store.



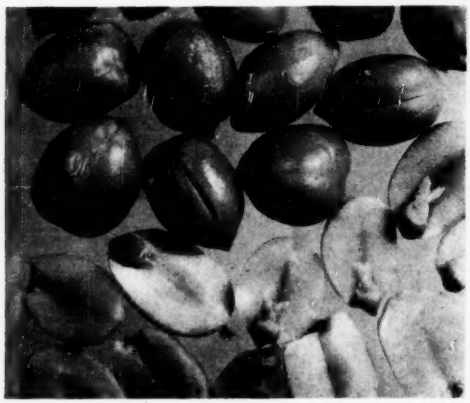
CAPACIOUS CLEANING UNIT washes, rinses, and dries lightweight cabinet. Carried in on conveyor, it goes through washing operation in four minutes.

QUICK PICTURE of the 'Why's' Behind Peanut Refrigeration

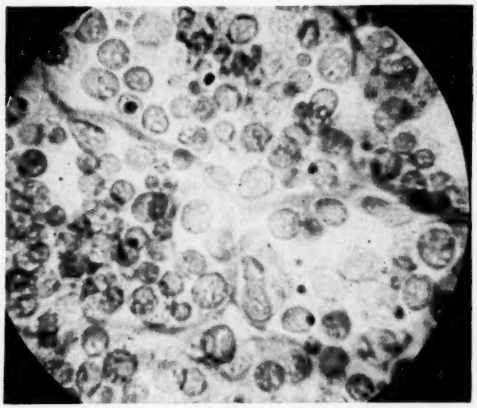
1 In their shells, peanuts are fairly well protected. About 4 million pounds of nuts are cold-stored in shell.



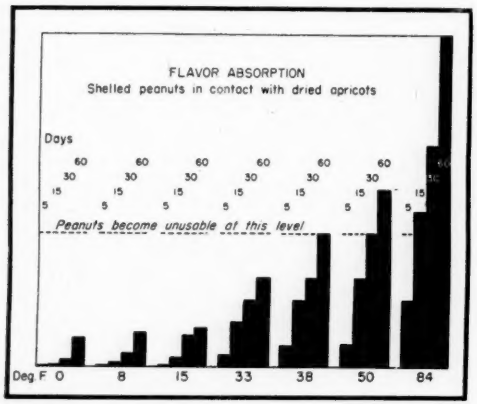
2 So effective is protection by shell and skin that 9 mo. storage in shell equals 3 mo. with shells removed.



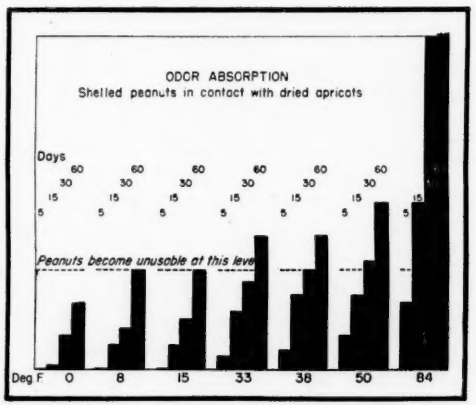
4 The shelled peanut is highly vulnerable. When split, it deteriorates about three times as fast as when whole.



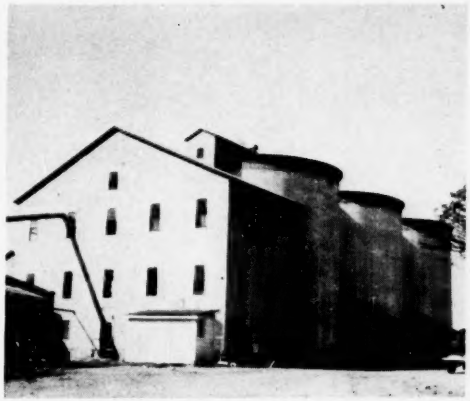
5 Oil droplets are dispersed in kernel. Bruising or heating causes oil to spread on surface, become rancid.


FLAVOR ABSORPTION
Shelled peanuts in contact with dried apricots
Days
60 60 60 60 60 60
30 30 30 30 30 30
15 15 15 15 15 15
5 5 5 5 5 5
Peanuts become unusable at this level
Deg.F 0 8 15 33 38 50 84

7 Here is effect of temperature on extent to which shelled nuts absorb flavor in contact with dried apricots.

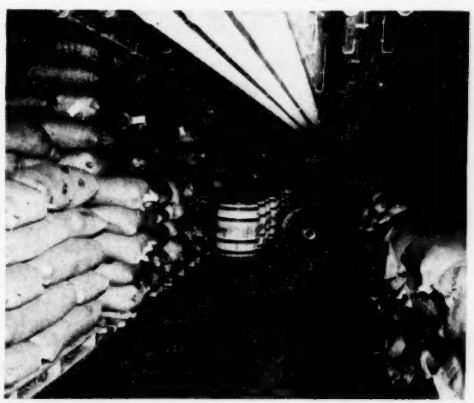

ODOR ABSORPTION
Shelled peanuts in contact with dried apricots
Days
60 60 60 60 60 60
30 30 30 30 30 30
15 15 15 15 15 15
5 5 5 5 5 5
Peanuts become unusable at this level
Deg.F 0 8 15 33 38 50 84

8 This chart shows extent to which shelled nuts pick up the odor of the apricots at different temperatures.



3 But to save weight and space, the nuts usually are shelled before storage. Here is typical shelling plant.

6 Tests have been made to determine effect of refrigeration on peanut quality, samples being taken periodically.



9 Because of foregoing factors, it pays to keep peanuts in dry, clean, odor-free refrigerated warehouse.

How Refrigeration Protects Quality Of Peanuts*

Nuts kept in low-temperature storage have superior flavor and color and are not damaged by insects . . . Activated carbon found effective in preventing odor absorption and in removing foreign flavors from the nuts.

J. G. WOODROOF, HELEN H. THOMPSON, and S. R. CECIL
Georgia Experiment Station, Experiment, Ga.

It pays in many ways to store peanuts under refrigeration. Experiments over a period of several years have demonstrated this. Proper refrigerated warehousing prevents insect infestation, greatly retards rancidity, and retains the fresh color and flavor for more than two years. It is the only means by which peanuts may be held for more than a few months in summer without appreciable loss of quality.

The high oil content causes peanuts to become stale or rancid easily. The pleasing aroma and delightful flavor—especially after the nuts are roasted—makes peanuts particularly subject to insects and rodents.

But cold storage alone is not enough. Care must be taken to prevent absorption of odors and flavors. Answers to all of these peanut-storage problems are presented here, together with data showing the economic trends in the peanut industry.

Odorless Storage Room Needed

Peanuts readily absorb volatile odors and flavors when brought into direct contact with them, especially when there is no ventilation.[1] The odors of certain fruits and vegetables—such as apples, citrus fruits, dried apricots, potatoes, and onions—are especially troublesome,[2] as are also the odors from fish and smoked meats.[3] Particularly objectionable are the odors from decayed vegetables.[2]

It is important, then, that peanuts be stored in a cold room without odors. And if they must be kept with other foods, those products must not have incompatible odors. Foods which may be successfully stored with peanuts are rice, grains, dried eggs, dried milk, candy, dried coconut, blocked chocolate, other nuts, and anything sealed in glass jars, metal containers, or odorless paper bags.

An experiment was conducted in which bags of peanuts and dried apricots were packed together in tin cans, and these in turn were stored at six temperatures ranging from

* This research was sponsored jointly by the Georgia Experiment Station and the Refrigeration Research Foundation, and it is published, with the approval of the directors of each institution, as Georgia Experiment Station Paper No. 181, Journal Series. The figures on production and cold storage were taken from *Cold Storage Reports*, Production & Marketing Administration, USDA.

0 deg. F. to room temperature. The amount of apricot odor and flavor that was detected in the peanuts at intervals up to 60 days is shown (see charts at bottom of first page). But in interpreting these results, it should be remembered that the atmosphere surrounding the peanuts was practically saturated with apricot odors—a condition seldom found in cold storage warehouses.

The rating of odors was higher than that of flavors at any given time. The odor of apricots was detected in about half the time required for detection of the flavor by taste, and the intensity of the odor at any time was about twice that of the flavor. The condition may be due to the fact that during the early stages of storage the atmosphere around the peanuts contained foreign odors even before they were absorbed internally by the peanuts and recorded as flavors. The same relationship was found with many other products stored with peanuts.

The effect of storage temperature on the rate of absorption of odors and flavors was very marked. At 33 deg. F., the rate of absorption was less than half of that at room temperature, and about five times that at 0 deg. F. The lower the temperature the slower was the absorption of flavors, but at none of the six temperatures used was the flavor "frozen." Shelled peanuts stored near onions at 0 deg. F. absorbed the flavor in a little over a month.

The rate at which peanuts absorb foreign flavors also depends upon accessibility. Absorption of flavors by peanuts stored in eight bags in a meat curing room was much greater in the nuts near the walls of the bags and negligible in those at the center. A detectable amount of smoked meat flavor was found in the peanuts nearest the walls of the bags within six days. But very little was found in the center of the bag until 80 days.

For this reason, samples of peanuts taken through the side walls of bags for inspection in storage do not accurately represent the average condition of the peanuts throughout the bags.

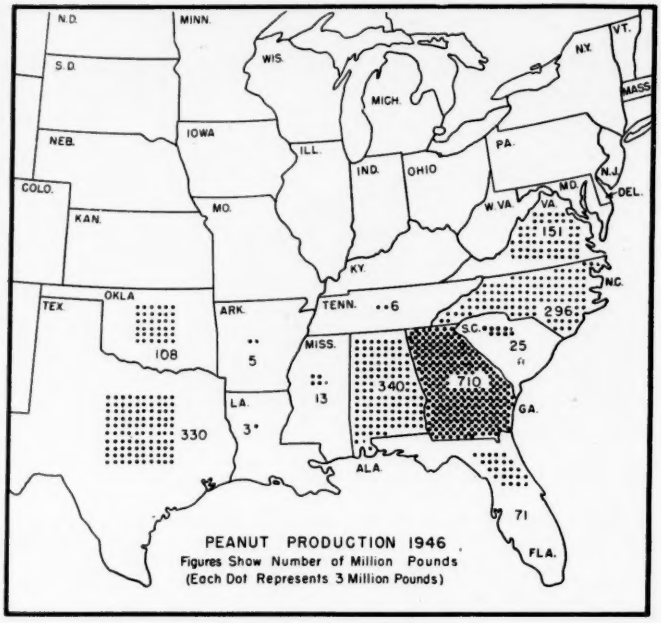
The rate at which shelled peanuts absorbed flavors was seven times that at which the unshelled nuts absorbed flavors when stored under the same conditions.

Activated Carbon Helps

A test was set up to determine if canisters of activated carbon pellets or of silica gel in the bags of peanuts would prevent the absorption of apricot flavors by the nuts. The presence of carbon in the bags was effective in retarding the absorption of flavors at room temperature and in cold storage, but did not prevent it entirely. Being near the center of bags, the carbon did not "protect" the peanuts near the walls from foreign flavors.

Results show that activated carbon has a greater affinity for flavors than peanuts have. And it may be used successfully as a means of adsorbing flavors from the atmosphere before they are absorbed by the peanuts. To accomplish this, either the bags in which the nuts are stored must be treated with carbon, or the atmosphere around the bags must be filtered through carbon and circulated around the bags. The amount of filtering and circulation depends upon the concentration of odors in the storage atmosphere.

Experiments were conducted in which peanuts were stored in both cotton and jute bags that had been treated with starch containing activated carbon. Similar untreated bags were also used, as well as others which were treated with talc as a filler. The bags of peanuts were stored in an atmosphere containing apricot odor, and after considerable time, the nuts in the carbon-treated jute and cotton bags were practically free of apricot flavor. But those in untreated or talc treated bags had a very strong flavor of apricots.



Peanuts are Grown in Relatively Few States . . .

In 1946, 2,061 million pounds were produced in 12 states. Principal growing states are Georgia, Alabama, Texas, North Carolina, Virginia, Oklahoma.

It is suggested that questionable cases of the existence of odors be taken up with reputable manufacturers of deodorizing equipment to make sure that adsorption fatigue and poor circulation are avoided by good installations.

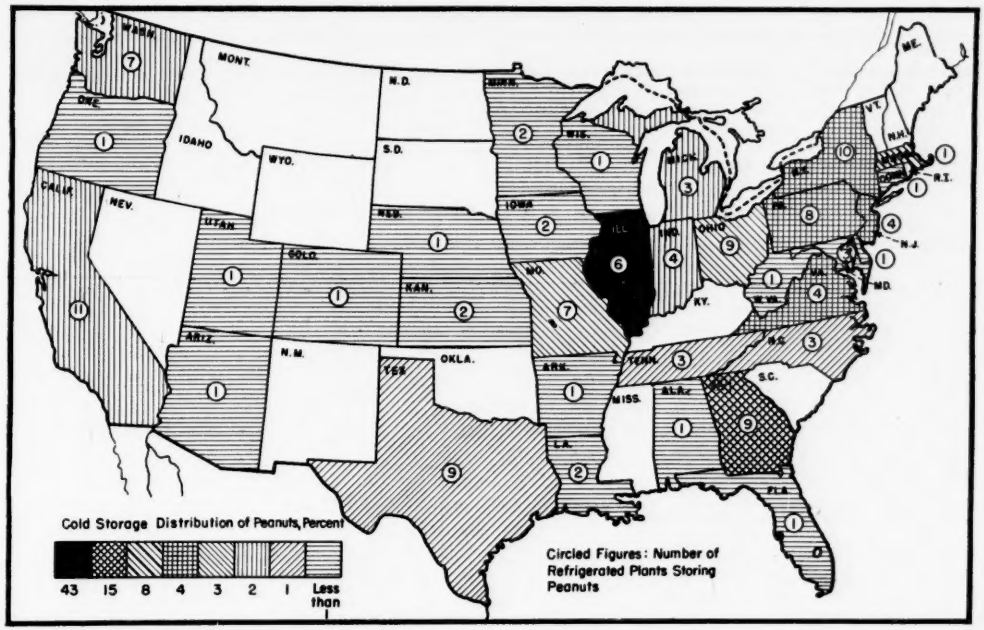
Portable air purifiers containing activated carbon and a fan for circulating the air are on the market. And a stationary unit can be built into the cold storage room. In either case, the carbon gradually will become saturated with atmospheric flavors and must be replaced. The used carbon pellets can be returned to the manufacturer and reactivated.

Silica gel was not as effective as carbon in adsorbing atmospheric odors in the presence of peanuts.

Removal of Flavors

It often is desirable to remove flavors from peanuts that have become contaminated. Aeration has been found expensive and not very effective, and the peanuts must be emptied from the bags for the treatment. Exposure to sunlight or an atmosphere of ozone has been quite effective when the peanuts were removed from the bags and the treatment extended for several days. But sunlight and ozone stimulate the development of rancidity.

Gross and Smock[4] found that ac-



. . . But are Cold-Stored Across the Country

On this map is shown the percentage distribution of peanuts in cold storage and number of refrigerated plants storing peanuts, July 1, 1947, by states. There were 69,098,000 lb. of peanuts cold-stored in 33 states, almost half in Illinois.

tivated carbon from coconut shells was effective in removing certain types of odorous volatiles from cold storage rooms. Uota *et al*[5] reported that use of activated carbon was the best way to remove from foods the foreign odors of apples, pine wood, onions, cabbage, potatoes, pears, oranges, and fish.

Smock and Doren[6] stated that several days of airing or several days of exposure to 1-2 ppm. of ozone in the atmosphere destroyed "box odor" in apples that were removed from cold storage. Vidler[7] surveyed the uses of ozone in cold storage and stated that taints of fuel oil, smoke, orange and apple have been successfully removed from cargoes of foodstuffs by ozone treatments.

Apple Flavor Taken Out

Since activated carbon was effective in preventing the absorption of flavors by peanuts, an experiment was set up to determine whether its affinity for flavors was strong enough to remove them from peanuts. Peanuts contaminated with apple flavor were exposed to a current of air that had been purified by passing it through a bed of carbon. Within 6 hours, about half of the apple odor was removed. By the third day there was no trace of the odor. But the removal of flavors was much slower. Six days were required to remove half of the flavor. After ten days of treatment, no apple flavor was detected in the nuts after roasting.

If one is planning to remove flavors from peanuts, it is best to take the nuts out of cold storage first. An experiment was conducted in which peanuts that had absorbed apple flavor were treated with activated carbon at four temperatures: 84 deg., 48 deg., 33 deg. and 2 deg. F. The rate of removal of flavor was in proportion to the temperatures used, being most rapid at the highest temperature and hardly noticeable at 33 deg. or lower, even after 12 weeks.

In another experiment, similarly contaminated peanuts were placed in bags close to canisters of activated carbon, no attempt being made to circulate the air through the two products. After 80 days at room temperature, most of the odor but little of the flavor was removed from the peanuts. These nuts, as with others held in closed containers at room temperature, tasted quite rancid after about two months.

It is concluded that foreign flavors may be removed from peanuts by vigorously circulating odor-free air through the peanuts for ten days or more. The odor-free air may be obtained by the use of activated carbon, and thorough circulation is achieved by placing the peanuts in a layer so thin that air circulates around each peanut—not just around the bag of nuts.

Effects of Roasting

Since much of the tonnage of cold stored peanuts is used for roasting in oil, tests were conducted to determine if the heat of roasting would vaporize foreign flavors, or if such flavors would otherwise diminish during oil roasting. This is what we found:

When peanuts contaminated with apricot or apple flavors were roasted in fresh oil, the nuts lost most of the flavors. But on subsequent roastings in the same oil, smaller amounts of the flavors were lost, until finally none was lost. Examination revealed that the flavors lost from the peanuts were absorbed by the oil, which itself became increasingly contaminated, and finally unusable. The pure oil apparently had a greater affinity for the flavors than the peanuts, which contained only about 45 percent oil.

Numerous attempts have been made to remove foreign flavor from peanuts by dry roasting, but with practically no success. Peanuts which had absorbed ham flavor retained that flavor after being roasted. And peanuts with apple flavor continued to taste like

Storage Temperatures, Production, and Holdings

TABLE I—UNSHELLED PEANUTS: Effect of Four Storage Temperatures for One Year

Storage		Desirable Qualities of Peanuts*					
Temperature (deg. F.)	Period (months)	Appearance (10)	Color (10)	Aroma (10)	Flavor (55)	Texture (15)	Total Score (100)
.....	none	10	10	10	55	15	100
32 to 35	3	10	10	10	54	15	99
32 to 35	6	10	10	10	54	15	99
32 to 35	9	10	10	9	53	14	96
32 to 35	12	10	10	9	52	14	95
38 to 42	3	10	10	10	54	15	99
38 to 42	6	10	10	10	52	14	96
38 to 42	9	10	10	9	52	14	95
38 to 42	12	10	10	8	50	14	92
Alternated (33-35 & room)	3	10	9 (slightly brown)	10	53	15	98
Alternated	6	10	8 (brown)	10	51	14	93
Alternated	9	10	7 (brown)	9	50	14	90
Alternated	12	10	6 (brown)	8	49	14	87
70-90 (room)	3	9	8 (brown)	10	52	15	94
70-90	6	8	7 (brown)	10	50	14	89
70-90	9	7	6 (brown)	8	50	14	85
70-90	12	6	5 (brown)	8	47 (slightly flat)	13	82

*Appearance was scored on unshelled peanuts; other qualities on shelled peanuts.

TABLE II—RAW SHELLED PEANUTS: Effect of Four Storage Temperatures for One Year

Storage		Desirable Qualities of Peanuts					
Temperature (deg. F.)	Period (months)	Appearance (10)	Color (10)	Aroma (10)	Flavor (55)	Texture (15)	Total Score (100)
.....	none	9	10	10	53	15	99
32-35	3	9	10	10	54	15	98
32-35	6	9	10	9	53	14	95
32-35	9	9	10	9	52	13	93
32-35	12	9	10	8	50	13	90
38-42	3	9	10	10	54	15	98
38-42	6	9	10	9	51	14	93
38-42	9	9	10	9	45 (musty)	13	86
38-42	12	9	10	7	44 (stale)	13	83
Alternated (32-35 & room)	3	9	9 (slightly brown)	10	53	15	96
Alternated	6	9	8 (brown)	8	47	14	86
Alternated	9	9	7 (brown)	7	43	13	79
Alternated	12	9	6 (brown)	6	40 (flat)	13	74
70-90 (room)	3	9	8 (brown)	10	53	15	95
70-90	6	9	7 (brown)	6	43	13	78
70-90	9	9	6 (brown)	5	40 (flat)	13	73
70-90	12	9	5 (brown)	5	35 (strong)	12	66

TABLE III—PEANUTS CLEANED AND SHELLED, by Types and Years (1938-47), Thousands of Pounds

Year Sept. 1-Aug. 31	Unshelled	Shelled				Quantity shelled (percent)
		Virginias	Runners	Spanish	Total	
1938-39.....	70,298	137,252	78,667	229,948	445,667	85
1939-40.....	67,056	192,784	67,956	253,767	514,507	87
1940-41.....	75,137	249,935	56,249	278,201	584,385	88
1941-42.....	61,302	196,675	89,496	257,270	543,441	89
1942-43.....	63,360	227,752	185,112	430,429	843,293	92
1943-44.....	83,191	175,359	213,222	410,437	799,118	86
1944-45.....	102,492	185,810	227,275	420,469	833,554	88
1945-46.....	92,177	152,379	257,345	459,707	869,431	84

TABLE IV—REFRIGERATED WAREHOUSE HOLDINGS of Shelled and Unshelled Peanuts (1947-48), Thousands of Pounds

States	Aug. 1		Oct. 1		Jan. 1		Apr. 1	
	Shelled	Unshelled	Shelled	Unshelled	Shelled	Unshelled	Shelled	Unshelled
New England	4,602	...	2,772	...	806	51	611	.....
Middle Atlantic	5,778	257	3,516	113	3,245	1	3,249	2,423
E. No. Central	26,431	2,126	14,084	1,665	21,440	595	19,261	72
W. No. Central	1,424	396	968	472	524	135	333	80
South Atlantic	10,830	359	5,444	133	3,517	34	3,287	45
E. So. Central	786	48	256	22	648	4	297	14
W. So. Central	276	89	141	28	553	3	138	.....
Mountain	229	10	266	10	146	...	105	.....
Pacific	1,021	381	1,030	231	1,024	62	1,141	981
Total	51,377	3,666	28,747	2,674	31,903	890	28,422	3,615

apples after being roasted, blanched and ground into peanut butter. It is certain that a small amount of absorbed flavor was lost during dry roasting, and that a certain amount of it was masked by the peanut flavor which developed during the roasting process. For practical purposes, however, both of these losses were negligible.

Storage of Shelled vs. Unshelled

Peanuts are handled differently from most other edible nuts in that about 87 percent of them are shelled before being shipped or stored. Those intended for use directly as food are shelled with care to minimize breakage of the meats, and are then cleaned and graded. The best unbroken nuts are segregated for those outlets which require whole nuts of good appearance, while the others are distributed to less exacting users. Peanuts which are intended for crushing for oil are shelled with much less care than the others.

Peanuts which are sold in the shell are of the large Virginia or Tennessee types. They are cleaned very carefully and graded to insure uniformity of size and appearance. The shells are then usually whitened to a uniform color and polished, after which the nuts are sold to wholesalers. They may be retailed either raw or roasted, but are always roasted in the shell.

The Spanish and other types that are used in peanut butter, in candies, incorporated into bakery products, or merely salted for consumption, are shelled soon after they are harvested and dried. Shelling reduces the space occupied in storage by about two-thirds and the weight by about one-fourth. But the shelled nuts are more vulnerable to attack by insects, molds, and rodents, as well as to absorption of moisture and foreign flavors and to development of rancidity.

During shelling, the seed coat often is cracked or broken and the cells immediately beneath are bruised, permitting free oil to escape. Rupture of some of the surface cells permits the oil to crawl over the entire surface of the kernels, giving them a greasy appearance. Contact of air with these oily surfaces soon causes staleness, loss of fresh flavor, and rancidity. The colder and dryer the storage, and the less air available, the longer shelled peanuts will remain fresh.

Since peanuts are very subject to "weevil" attacks when held in ordinary storage, Clay[8] recommended keeping them in refrigerated storage during the warm months of the year, even during their shipment by water. He stated that peanuts with unbroken shells could be stored for a considerable period in ordinary dry storage and suffer little change, except that the skin adheres more tightly and the color grows darker.

However, if the shells are cracked (as they usually are), the kernels are subject to mold, weevil attack, and rancidity. Rose[3] stated that unshelled peanuts may be held in common storage if dry and if protected against insect infestation, but that shelled peanuts will deteriorate unless kept in refrigerated storage. Stanbury and Guthrie[9] found that unshelled peanuts may be stored for more than two years in cans, at 1 deg. C. (34 deg. F.)

or below, without appreciable change, but a slight increase in free fatty acid content occurred in storage at room temperature.

The authors conducted an experiment in which unshelled peanuts were stored for one year at 32 to 35 deg. F., at 38 to 42 deg., at room temperature (70 to 90 deg.), and at temperatures alternating from the lowest to the highest of these ranges at six-week intervals (see Table I).

Organoleptic and chemical tests showed that the nuts stored at the lowest average temperature remained in the best condition. Those held at the highest (room) temperature lost the most quality, while those kept at intermediate temperatures ranged in between. Because of the protection by the shell, none of the peanuts became rancid in one year.

Scored After Long Storage

After one year in storage, the total score on appearance, color, aroma, flavor and texture of unshelled peanuts stored at the four temperatures, ranging from the lowest to the highest were, respectively, 95, 92, 87 and 82 percent; the free acid values were 0.07, 0.13, 0.15 and 0.21; and peroxide numbers were 0.2, 0.5, 0.5, and 0.3. The nuts held constantly under refrigeration retained their fresh flavor and color, while those stored at room temperature, or at alternating temperatures, began to discolor in three months. This difference in color, however, was not noticeable after the nuts were roasted.

The benefits of refrigeration were mainly the prevention of insect infestation, and retention of the bright color of the skins and the delicate aroma and flavor of the peanuts after roasting.

Development of rancidity in peanuts is accompanied by increases in free acid value if rancidity is of hydrolytic nature, or by increase in peroxide number if rancidity is of oxidative nature. While slight rancidity may be of both types, rarely if ever do both occur together, because conditions favoring hydrolysis retard oxidation, and vice versa. These values for fresh peanuts should not exceed 0.30 percent for free acids and 3.0 for peroxide number.

In another experiment, No. 1 shelled peanuts were stored for one year at the same four temperatures as described for storing unshelled peanuts. As shown by Table II, those which were held at the lowest temperature remained in the best condition, and those stored at room temperature deteriorated the most rapidly.

Peanuts held under refrigeration at the proper relative humidity retained their natural pink color and had desirable odors and flavors. After one year in storage, the total score on appearance, color, aroma, flavor, and texture of peanuts stored at the four temperatures, ranging from the lowest to the highest were, respectively, 90, 83, 74 and 66 percent; the free acid values were 0.05, 0.04, 0.19 and 0.19; and the peroxide numbers were 0.5, 0.3, 0.3 and 0.3.

At room temperature, the peanuts not only were subject to attack by insects, but there was a slight loss of flavor, also a development of a brown color, within three months. From three to four months was as long as shelled peanuts kept fresh unless refrigerated. By six months there was a rancid odor which was not detected by taste, and after nine months there was a strong odor and flavor of rancidity. The rancidity and brown color became progressively worse as the storage was continued.

Alternating the peanuts from cold storage to room temperature every six weeks was only slightly better than storing them constantly at room temperature. However, it was shown definitely that no detrimental effects resulted from cold storing the nuts and then removing them to room temperature. Nor were there any ill effects from moisture condensation on the bags. There were benefits from cold storage for even short periods, or when the peanuts were repeatedly moved in and out, provided excessive moisture did not accumulate by condensation when cold peanuts were warmed up.

From organoleptic tests of split and whole peanuts cold-stored in the presence of a variety of flavors over a period of three years, it was concluded that split peanuts absorbed odors and flavors and became rancid three or four times as fast as did whole peanuts with unbroken skins.

It was found that unshelled peanuts held their quality more than three times as long as those that were shelled, irrespective of the storage temperature. Shelled peanuts reacted to cold storage much the same as did unshelled peanuts—insect infestation was prevented, the bright pink color was retained, and stale, musty or rancid flavors did not develop. Both shelled and unshelled peanuts when properly refrigerated were far superior to those that were not refrigerated because of better color, fresher flavor, and freedom from insects.

Trends in Peanut Storage

Almost 51½ million pounds of shelled and more than 3½ million pounds of unshelled peanuts were cold-stored throughout the United States as of August 1, 1947 (Table IV). By October 1, the tonnage in cold storage had dropped to almost half these figures. The low point was reached in November, when there were 2.8 million pounds of shelled and 1.7 million pounds of unshelled peanuts in cold storage. About November 15, the new crop began to reach cold storage, and peanuts already in storage at that time were considered as carryover.

On August 1, 58.8 percent of all shelled nuts in cold storage were peanuts, and of all unshelled nuts in cold storage 14.8 percent were peanuts. The removal from refrigerated cold storage and consumption of unshelled peanuts appears to be more seasonal than that of shelled nuts. On October 1, 1947, 9.4 percent of the peanuts in refrigerated cold storage were unshelled, while by January 1 only 2.7 percent were unshelled, indicating that a greater proportion of unshelled than shelled peanuts were consumed during the "football and holiday seasons."

Consumption Increasing

The quantity of shelled and unshelled peanuts to enter the edible trade in the United States has been increasing for several decades, with a notable spurt during the past nine years (see Table III). For each of the past three years, about 800 million pounds of shelled and about 100 million pounds of unshelled peanuts have been used in peanut butter, salted peanuts, peanut candies, roasted peanuts, and other products. An average of 87½ percent of the peanuts for the edible trade were shelled before being shipped or stored.

In 1946, production of peanuts in twelve states, for the edible trade, amounted to 2,061 million pounds. The principal peanut growing states, in order of importance, are Georgia, Alabama, Texas, North Carolina, Virginia and Oklahoma.

For the nine-year period from 1938 to 1947, there was an average carryover of 12½ million pounds of unshelled and 87 million pounds of shelled peanuts. The carryover amounted to 13.7 percent of the unshelled and 16.7 percent of the shelled nuts. It is virtually essential that carried-over peanuts be held in cold storage to preserve them.

The new crop of peanuts enters the channels of trade each year in September. In that month of 1945, 62 million pounds were cleaned and shelled. Three times this quantity was handled in October, and almost 250 million pounds were cleaned and shelled in the peak month of November. There was a steady decrease in this figure for succeeding months, reaching a

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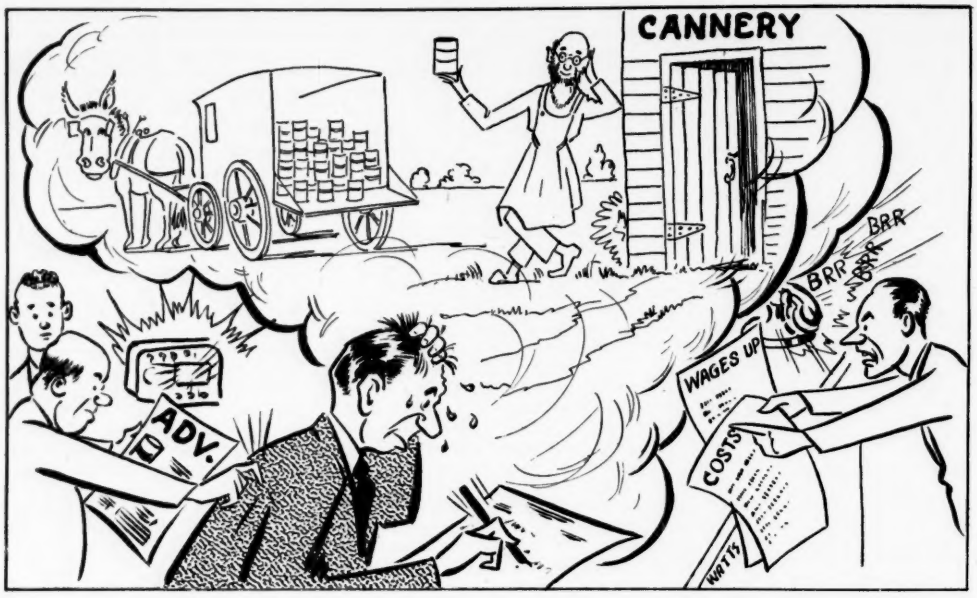

"Dear Grandfather: Look at The Canning Plant Now...

"... After years of building, you handed down the business to Dad. Then it came to me. Some of the changes may puzzle you. They puzzle me, too"

By FAMILY CANNER III

Note: This article is published because of the rich vein of memory and comparison it will open for many members of the food industry. Its author, who holds a high place in the regard of his fellow food canners, insists upon remaining anonymous.—The Editors.

I'M JUST A SHADE under 50, and if my wishes count for anything, I hope to be blessed with 50 years more, because there's so much yet to be learned, yet to be done, yet to be enjoyed.

Grandfather founded one of the earliest canning plants in the United States and—as his preserved records indicate—he did it the hard, yet simple, way. At the turn of the century he turned the reins of his business over to my dad, who also did things the hard way, again according to carefully preserved records. But he didn't do them quite as simply as grandfather.

I walked into the "front office" a little over 20 years ago and called it *mine*. That, I thought, was a great day for me!

Being born and baptized into a canning family, being trained from early boyhood to follow in canners' footsteps, plus having a quite natural inclination toward the canning business, all pointed me in the right direction. The necessity of preserving a good, sound business was well-impressed in my mind and my inclinations ran in that direction. The further development and enlargement of the business seemed not only desirable but necessary so that, at my retirement, there would be a more substantial property ready to be turned over to my sons and my sons' sons as they came along.

I, too, have spent 20 years doing things the hard way, because that is the way we've had to do them. But, we haven't been able to maintain the simple, the uncomplicated way of former days. Maybe the simpler ways just can't be maintained.

In any event, I've decided to take this opportunity to write, in my mind's-eye, an imaginary letter to grandfather. It will go something like this:

My dear Grandfather:

I am homesick for you, grandfather —homesick for the ways of your life and homesick for your ways of doing business. Early in your life you established, without the benefit of either capital or education, a business which provided for you and your loved ones a decent and respectable living, a home, and a modest private estate.

Your interesting and invaluable records, so carefullly preserved through the years, show me that you practiced frugality and infinite care in all your dealings, yet added a mixture of adventure in your daily business life. You prospered, grandfather, because you were a pioneer in a then unknown field; because you ventured into the future with firm convictions; because you were careful and honest and honorable in every business transaction.

"Never Questioned"

You took your neighbors' vegetables and canned them, and you paid your neighbors as much as you could after your canned products were sold. They never questioned the price you paid them because they knew that you dealt, not in dollars, but in honor.

Your bills for other materials were always paid—sometimes when overdue, but you never had any altercations with your suppliers. You sold your modest packs at fair prices generally, through what appeared to be friendly channels.

You knew nothing about advertising because you lived in an earlier age. Your product, with your name on it, was sufficient guarantee to your customers that the products were the best you could produce. And, after selling your packs you generally collected your money, paid your bills and, like any good businessman, divided the balance between the expansion of your business and the improved care of your family.

Certainly, Grandfather, you had your anxious moments, your worries, your misgivings; but all added together, they still made a simple business and a better-than-average livelihood for the family.

You lived during the time dad ran this cannery, so there is no purpose served in rehearsing his activities, his winnings, his losses, his contributions to a bigger and more substantial business and his contributions to the industry both as a pioneer and as a leader in association work.

But today, grandfather, is another day, and I'd like to soften my homesickness, my nostalgia, for your day by relating what is happening and threatening to happen in these days of 1948.

We have in this day and age a government of which, thank heaven, we are mightily proud. But there are certain departments and certain bureaus within our government that have "coddled" certain classes of our people to the extent that we can no longer run our own business.

Those Rises and Falls

Our growers and our laborers no longer trust the company to which you so proudly gave your name, because certain elements within our government have become gracious to class groups. The rise and fall of the economic tide for the grower and for the laborer will always take place, just as surely as the rise and fall in the ocean's tide. But in our government today, grandfather, the rate of the rise and fall is planned in advance and at times definitely sustained by these elements within our government.

It has become, sad to relate, our untidy task to quarrel with both grower and laborer; and it has been an unfair fight in that we must maintain our relative competitive position or lose our business; and at the same time we must acknowledge—distasteful as it may be—labor's demands for higher and still higher rates and the grower's demands for higher and still higher prices for raw produce.

Now, if labor would be willing to put forth additional effort in return for its gains, and if our growers would be willing to bring us top-quality raw materials instead of run-of-the-field materials, we could more readily reconcile and understand their demands. But that, unfortunately, is not happening.

"Willingly Supported"

In your day, grandfather, you surrounded yourself with a group of men whose activities were manifold. They worked in the plant, they worked in the warehouse, they drove teams, they delivered your packs. No matter the task, they were working with you and they willingly supported you in return for employment at a fair wage. Today, labor is departmentalized, and an employee hired for one particular function cannot cross imaginary lines and assist in another department without long consultation of a tedious nature with members of the group formed back in your time by Mr. Gompers—and then the request is generally refused.

I don't hate labor unions. Far from it. I believe they have contributed much to the general welfare of our country. But in our case their leadership is slip-shod, many times irresponsible and more often political.

In your year, grandfather, you had a group of men who supported you when and where you needed it. Today we have an "organization" wherein there is an engineering department, a production department, a research laboratory . . . and all of these departments were carefully staffed as we built them up, so that men and management would all meld into a forceful, effective and congenial group of people.

But, alas! As is so often the case these days, jealousies, politics and sniping, take place regularly. One department head is jealous of another; another department's employees feel that others receive imaginary benefits. The result is that I spend hours and days keeping harmony, or something resembling it, in the company you so proudly founded.

The activities and boundaries of the production and engineering departments are clearly defined, and they operate pretty much as men with many hands. So it is, too, with those in the research laboratory, who many times, are closeted months at a time on the development of a new product or the improvement of the old.

Those departments can be pretty well controlled, and they're made up of pretty sensible people—three-fourths of the time. It's the other 25 percent of the time that I've got to worry about, and as I see it, I'll just have to continue worrying until my weary bones give out.

I often heard dad say that I was the first salesman born into the family; that you and he were mainly production men. While I disagreed with dad's statement, nevertheless I have always been inclined toward selling. However, today I can't just "incline" in a selling direction, because we have a new department, since your day, known as the sales department—a separate property ruled over by a vice-president in charge of sales, a sales manager with three assistants, an advertising manager, and sales promotion manager.

Ballet-Dancer Temperaments

Now, that group of men comprising the sales department are the most violently ill-tempered group in the world; jealous of each other and, I suspect, at times jealous of themselves. They have all the temperament of ballet-dancers, and they assume unto themselves all the rights and prerogatives of the presidency of your com-

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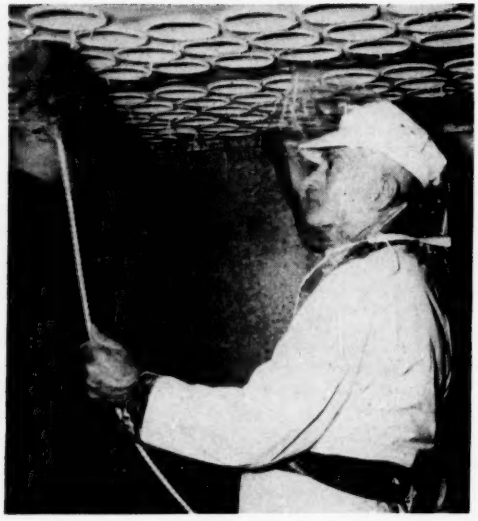


Transparent Bag Makes Fine Dust Mask

Compressor feeds powder-free air into workman's Pliofilm hood

H. E. KIBBEY
Plant Foreman, Kalamazoo Creamery Co., Kalamazoo, Mich.

It was the simple way that proved effective when, recently, the most practical means was sought for protecting workmen from dust while they are cleaning drying equipment.

Answer was a common Pliofilm bag—used as a head covering, with powder-free air supplied by hose from a small compressor. And the efficacy with which this accouterment works invites its use in numerous food industry maintenance jobs where dust is a hazard.

This new approach for protecting workmen was tried recently in the course of cleaning a C. E. Rogers spray-drier at the Kalamazoo Creamery Co., Kalamazoo, Mich. Many people are allergic to dusts with high protein content, such as milk powder, and some persons suffer the ill effects over a long period of time.

The problem in the case of this drier, which was working on skim milk powder, was more serious than in the case of whole milk, in which butterfat limits the amount of dust.

At the time the machine was installed, the manufacturer stated that he had not yet found a respirator that could be used satisfactorily in the cleaning process. The large volume of powder raised in cleaning down the walls and ceiling of the drier and in brushing out the tubes, of which there are many hundreds, soon plugs up the filter pad of a respirator. Hence, the manufacturer recommended that the cleaning men bind dampened pads of cheese cloth over the mouth and nose.

A local drug firm had kindly furnished respirators found successful in drug manufacturing, and these were tried. But the drier manufacturer was right. They were not practical.

Certain hood-type masks furnishing protection for the ears and eyes of the workman were also tried. But these were subject to the same coating-over. Even the cheese cloth pads, with their larger filtering area, tended to coat over, and they could not be bound on to fit the contours of the face.

A tendency on the part of the men was to raise the respirator or bandage pad when clogging occurred and breathing became difficult. They would do this rather than come out of the machine to renew the pads.

How They "Hit On" the Bag

The best solution to the problem appeared to be to pump fresh air to the man or men cleaning the chamber, rather than to try to filter the air they breathed. A Plexiglas helmet was then planned, and it would have been feasible but for the fact it was hard to get the proper support and fit around a man's shoulders.

A cloth helmet with transparent window then appeared the best solution—until the foreman, on a hunch, tried out a transparent bag. Here was the answer, absurdly simple.

Samples of various sizes were obtained. A Pliofilm bag, used for packing turkeys in freezing, proved to be of the right proportion. It is strong, light and extremely flexible. A supply of these bags was purchased. Then a small portable compressor and a ¼-in. hose (paint-spray equipment) enabled the first try. The hose end was attached to the cap of a worker, and the line was supported at the man's waist by a clip. Over the worker's head went the bag, and it ballooned slightly (see photo) as the air came on.

This light, filmy device gives the workman using it no sense of being enclosed; and it enables him to breathe dust-free air, since the positive pressure within the bag prevents any dust or powder from rising against the escaping air. Powder will not adhere easily to the surface of the Pliofilm, and any that does can be readily dislodged with a snap of a finger.

About the Air Supply

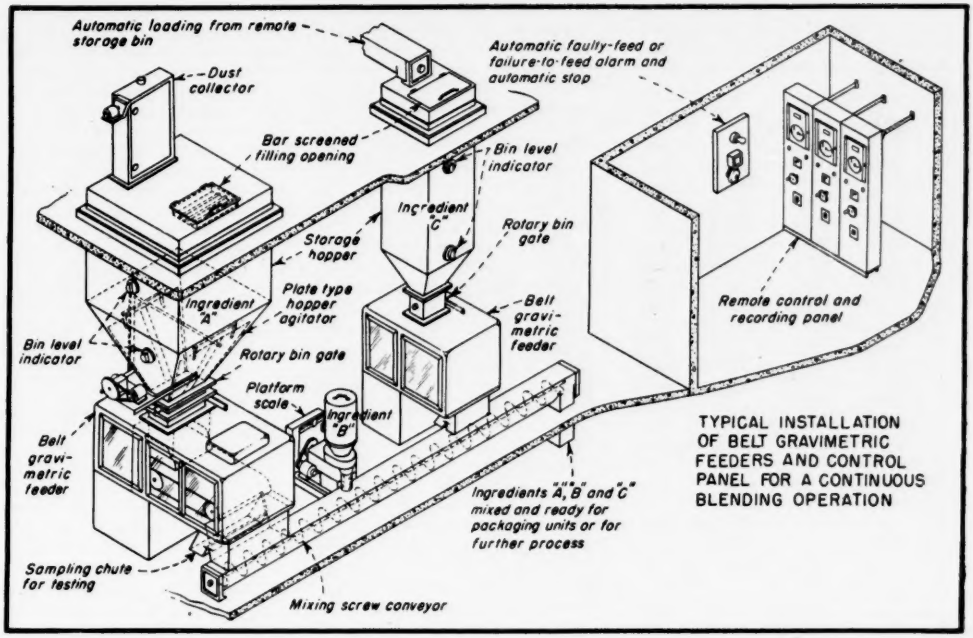
Since the time when the bags were first used, a larger compressor of the type used by the Navy in diving operations was purchased. It is mounted on the rear of the drier —near a line of windows and away from the dust area around the drying chamber door. The air could easily have been piped from farther away, but this was not necessary.

The compressor is a two-cylinder machine with a capacity of more than 9 cfm. at the pressure used. This is set at the present time at about 7 cfm., giving enough air for two masks. The pressure relief valve between the chamber and the compressor is set for 15 psi. This is sufficient to force the air through the small hoses. Reason for using small-size hose is that it is easier to flip around.

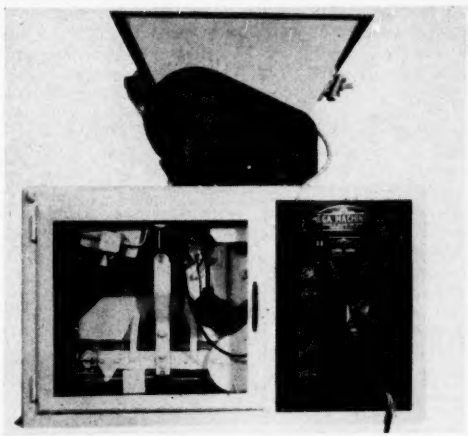
The compressor is rubber mounted. A rubber hose is used between the compressor and the nipple leading into the chamber, and inside the chamber there is a stainless steel header with two air cocks. Below each cock is installed a snap-on type connector. The fitting to match this is attached to one end of the 35-ft. hose, while the other end of the hose, which attaches to the worker's cap, is left plain.

The equipment is simple and light. It is supported on the worker's head by his white uniform cap, which has small grommets through which laces are drawn to tie on the hose. Finally, the bag is put on, and a neck band is pulled up to gather bag and hose. These neck bands are made of white elastic and employ white shoestrings.

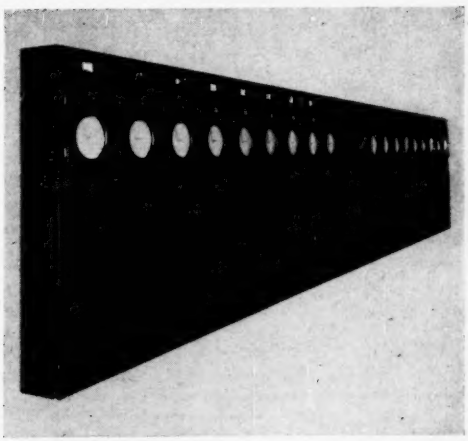
As for sanitation, this simple Pliofilm dust mask is readily washed and sterilized, and the hose can be cleaned. Since, however, the transparent bags cost only about 16½c. each, other operators adopting this device may deem it simpler to use new bags for each operation.


Automatic loading from remote storage bin
Dust collector
Bar screened filling opening
Automatic faulty-feed or failure-to-feed alarm and automatic stop
Bin level indicator
Ingredient "C"
Rotary bin gate
Storage hopper
Plate type hopper agitator
Ingredient "A"
Belt gravimetric feeder
Remote control and recording panel
Bin level indicator
Rotary bin gate
Platform scale
Ingredient "B"
Belt gravimetric feeder
Ingredients "A", "B" and "C" mixed and ready for packaging units or for further process
Sampling chute for testing
Mixing screw conveyor

TYPICAL INSTALLATION OF BELT GRAVIMETRIC FEEDERS AND CONTROL PANEL FOR A CONTINUOUS BLENDING OPERATION



SIDE-VIEW of belt-type gravimetric feeder. Panel door in glass permits visual check of unit in operation.



EIGHTEEN-UNIT remote control panel now in operation in a midwest food plant producing baking mixes.

Dry Food Materials Now Blended Continuously

P. A. COFFMAN, JR.
Chief Engineer,
Omega Machine Co.

Eighteen ingredients are proportioned automatically and fed continuously into a screw-conveyor mixer at a mid-western prepared-mix plant. This highly efficient steady-flow operation is made possible by a new development in automatic proportioning equipment.

A large cracker bakery uses this equipment in weighing and blending flour. A cannery employs it in a continuous apple sauce process where it feeds the sugar automatically and in the correct proportion. And in another cannery, the equipment automatically adds salt to tomato juice.

It can be used for several different types of dry ingredients and will handle mixing streams ranging from two thousand pounds to several hundred

thousand pounds per hour. The feeders and accessories may be arranged so that the plant will be almost entirely automatic in operation.

How It Works

Developed by Omega Machine Co this proportioning equipment consists essentially of vibrating feeders which discharge onto short endless belts suspended from scales, movement of the scale arm controlling the amplitude of feeder vibration and therefore the rate of feed. Several of these units can be arranged in parallel to discharge various ingredients onto a common belt in pre-set proportions. The latter belt then discharges into a mixer.

Material flows from a small hopper through an adjustable shut-off gate to the vibrating orifice-feeder tray, which discharges onto the belt. The vibrating movement is imparted to the tray mechanically by a cam-operated oscillator through a wedge-shaped rubber bumper which hangs freely from the scale beam between the oscillator jaw and the opposing jaw attached to the feeding tray (see schematic drawing below). Thus, when the beam and control wedge are lowered because of insufficient weight of material on the belt, the vibration of the feeding tray is augmented, causing an increase in feed. Too much weight on the belt tilts the scale beam up and retracts the wedge, thereby decreasing the feed.

Since a $\frac{1}{8}$-in. vibrating movement of the tray will effect maximum feed, the feeder will respond to the most minute fluctuation of the scale beam. The momentary contact of the oscillator jaws with the wedge does not affect the weighing or movement of the beam in the slightest degree.

A regulating knob at the oscillator mechanism adjusts the jaws to the right distance apart so that the scale beam will be level or "neutral" when the wedge is engaged sufficiently to effect the proper feed of the particular kind of material that is being handled.

Changes in feed rate are obtained by adjusting the variable speed transmission to drive the belt at the desired speed. That is, when carrying 20 lb. per foot, a belt travel of 1 ft. per hour will deliver 20 lb. per hour, and a travel of 100 ft. per hour will deliver 2,000 lb. per hour.

The weighbelt is attached to slats carried by sprocket driven chains at each side, instead of pulleys, so that there is never any difficulty due to material getting between the pulley and belt. This gives a positive drive and it is never necessary to train the belt.

To prevent flooding of finely ground materials, such as hydrated lime and soda ash, an automatic solenoid-valve-controlled air cylinder is attached to the handle of the adjustable gate, which is located just above the feeding tray. The solenoid is energized through either of two mercury switches.

One of these switches is tipped by a swinging baffle placed directly in front of the feeding tray so that it will operate immediately should material start flowing off the tray at too great a rate. The other is operated by the scale beam when a serious overload on the belt causes it to tip up sharply. When sufficient material has been delivered off the belt so that balance is restored, thereby opening the solenoid circuit through the switch, the air cylinder automatically opens the gate to its former position.

An alarm is set off by the scale beam when it tips too far up or down, indicating an over-feed or under-feed. The under-feed alarm will operate if the supply hopper becomes empty.

The counter or totalizer is geared to the belt drive shaft so that it reads in pounds. Since a constant weight is carried on the belt, a correction factor is never required regardless of the rate of feed.

Automatic control for a continuous dry mix is achieved through a master control board. The belt type gravimetric feeders that are synchronized and arranged in sequence are under button control from the board. Sequence controls are required if the mix is to be changed frequently or if the collecting screw conveyor is frequently emptied for cleaning or for any other reason. The simultaneous start and stop equipment for the belt feeder also includes starting and stopping controls for the conveyor.

When starting up with an empty conveyor, it is essential that the first feeder in the line of feeders along a screw conveyor start first, followed by the next feeder in line, which should not start until the material gathered by the conveyor has reached a point directly under the second machine. Thus, all feeders will start up in sequence as the material in the conveyor reaches each feeder.

Other Control Features

An automatic no-feed alarm is available which will operate if for any reason the feed belt itself stops moving. This may happen if there is a motor overload which causes the magnetic starter to cut out, or if someone accidentally switches off the motor when the machine is supposed to be running.

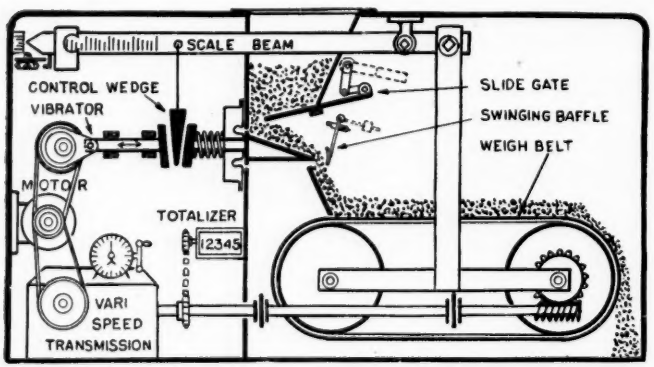
An overload or underload on the weigh belt will also cause the alarm and the control system to operate. Thus, if for any reason any feeder in the group ceases to discharge material, an alarm will operate and the entire line will shut down automatically.

Chart recorders that tell when the feeder is started and stopped, and also the amount fed, may be furnished for each machine. This recorder, mounted on a separate panel board for each feeder, includes a totalizer showing the number of pounds delivered by the feeder and indicates and records the rate of feed of the machine.

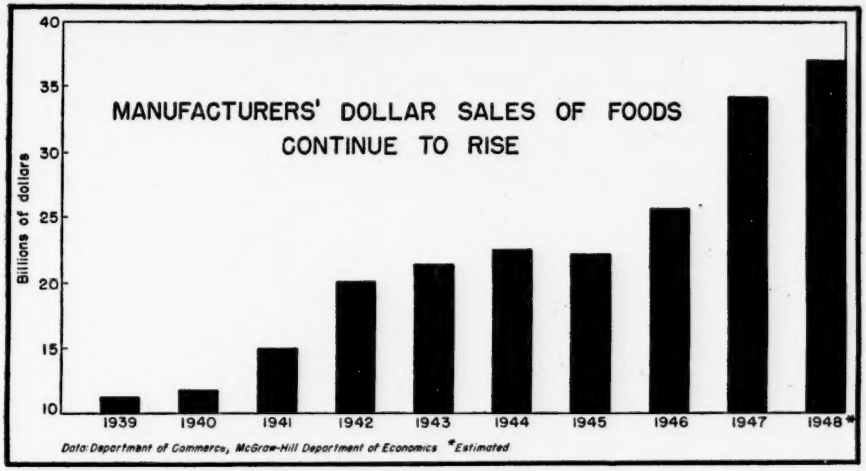
Remote rate setting from the panel board is available. When this is used, the rate is shown on the recorder with the amount of over or under feed, if any.

If desired, each feeder or group of feeders may be equipped with a counting-out totalizer, mounted either on the feeder or on the remote control panel, so that feeders may be used to prepare batches to go into existing batch blenders. When worked in this manner, the operator presses a start button and all feeders operate simultaneously to deliver the desired number of pounds of material and then automatically shut off.

In order to obtain continuous operation, the batch mixes should be arranged in pairs or in cloverleaf fashion. Then an identical batch can immediately be run off by simply pressing the start button again.



SCHEMATIC drawing illustrates operating principle of new belt feeder.



FI OUTLOOK FOR '49: Industry Faces Year of Adjustment

ROBERT ULIN
McGraw-Hill Department of Economics

The New Year finds the food industries in a readjustment period. Total dollar sales for 1948 broke all records. But sales are now leveling out as food prices drop. And higher operating costs will probably narrow most company profits as we swing into 1949.

Nevertheless, 1949 should see continued high production and sales for the food manufacturers. Consumer income is expected to remain close to the present high figure. And that means relatively heavy spending on food, although shoppers may not be bidding against each other and forcing prices up, as they did at most grocery counters during 1948.

1948 a Record Year

The records set by the food industries in 1948 will be hard to beat. Manufacturers' sales reached over $35,000,000,000, well above any previous year. Retail food stores also did more business than ever before. The physical volume of processed food production, as measured by FOOD INDUSTRIES' monthly index, ran slightly behind 1947, but far exceeded other years.

Food companies paid out a record sum in wages to employees, as wage rates continued to rise, although the number of workers leveled off early in the year. The industry is now paying its workers better than ever in the past.

Installation of new processing equipment proceeded at a high rate. The food industries invested about $500,000,000 in new buildings and equipment in 1948.

Now let us check on output: Activity during the year varied widely by branches of the industry. The greatest production gains over 1947 were shown by the margarine makers. They not only beat last year's total, but turned out close to three times as much as in prewar years. The high price of butter, margarine's competitor, combined with an ample supply of vegetable oils to make this possible. On the other hand, butter production ran well below 1947 figures.

Output of baked goods also registered a sharp increase in 1948. This was an achievement for this normally stable industry which has run at about the same level since 1944. By contrast, production of flour failed to equal the 1947 total, probably because of decreased foreign demand for this product.

The beverage industry's production went higher as Americans continued to increase their consumption of popular soft drinks. But ice cream and confectionery makers had poor luck. High prices for these products ran into substantial consumer resistance, and production consequently fell far below 1947. Cane sugar refining also went along at a much lower level.

Meat packing held close to 1947 production, except for a let-up during the spring packing strike. The number of animals available for slaughter was fewer. However, the big 1948 corn crop made heavier fall feeding possible, and in the closing months livestock was slaughtered at much increased weights.

The 1948 pack of fruits and vegetables failed to equal 1947 because of smaller crops available for canning.

Foreseen are —

- **Moderate declines in prices and dollar sales—but no sharp breaks.**
- **Continued strength in export demands.**
- **Persisting tussles with costs—the processors' No. 1 problem.**
- **Wage rates still climbing, but minimizing factors taking hold.**
- **Freight and overhead charges on the uptrend.**
- **New gains against narrowing profits, through higher productivity.**

The relatively low price of canned foods enabled packers to keep up unit sales volume and clear out surplus inventories.

Lower Sales Likely in '49

Food sales in 1949 will probably not reach the peak achieved in '48. In fact, the closing months of the old year already saw some reduction in consumer spending on food. A gradual readjustment has begun to lower food prices and lower dollar sales.

Main reason for this readjustment is the marked improvement in world food supplies brought about by the 1948 harvest. Crops were heavy both here and abroad. The shortage of feed grains has ended. From now on a slow but steady improvement in livestock supplies is expected. And already, many foods made directly from grains are in better supply.

As supplies increase, it cannot be expected that shoppers will go on paying premium prices as they have done in periods of scarcity. In order to keep up the good-eating habits acquired during the war, consumers had been spending less on other things and pinching savings. In 1948, people began saving considerably more of their incomes. They also spent more for durable goods, like automobiles. Consequently, the share of personal income spent on food dropped from 35 percent in the first three months of 1948 to around 31 percent in the final months.

With demand steady and supplies increasing slowly, food prices began their slip. The wholesale price of foods is now down about 6 percent from the all-time high reached in August 1948. Meanwhile, retail prices have dropped about 3 percent. So far, the decline has been gradual, not much more than would be expected with the seasonal increase in marketings. But it indicates a trend that can be expected to continue.

Declining prices slowed retail dollar food sales, which had been rising spectacularly through the first half of 1948. The later part of the year failed to see significant gains in volume. Manufacturers' shipments have also leveled off. October was the first month in which manufacturers' sales failed to top the corresponding month of 1947. And for the fourth quarter as a whole, sales did not show the same gain as a year ago.

Decline Will Be Moderate

The year 1949 will probably see further readjustment in food prices and further lowering of dollar sales. But no sharp decline in either sales or prices is likely during the first half-year. Spending on food will not fall off sharply as long as most workers are drawing high paychecks. And, with general business still prosperous, there is every chance that consumer income will continue high.

It now seems likely that business will keep booming well into 1949, carrying consumer spending with it. The heavy industries, which provide most of the jobs and purchasing power, will have to operate near capacity to meet the still unsatisfied demand for construction of all types for railroad cars, for electric generators and similar heavy equipment. The recent McGraw-Hill survey of business capital expenditures shows that spending on new plants and equipment is scheduled to continue at close to the 1948 rate. Government expenditures on defense, foreign aid and public works are rising. There is still enough demand for most consumer durables to keep factories humming. All this adds up to high employment and wages. And a large part of these wages will be spent on good eating.

Even if shoppers spend a somewhat smaller part of their incomes for food, consumption in units should hold up well. A moderate reduction in prices, especially for such expensive foods as meat and milk, might well stimulate more frequent retail food purchases.

More packages of processed food may also be sent abroad for military use and foreign relief. Although total food exports in 1949 are scheduled to decline, a greater proportion of them will be in processed food and less in grain. So, all in all, the physical volume of processors' sales should be sufficient to require high production. It is unlikely that unit sales can pick up enough to offset falling prices, but greater volume may well moderate any sales decline.

The prospects for food sales in 1949 are also helped by the conservative size of inventories now in the hands of processors and distributors. The total amount of food in cold storage on November 1 was below the figure for 1947 or the average for the past five years. Cooler occupancy, in particular, was the lowest since 1940. Stocks of canned goods held by packers, wholesalers and retail food chains are likewise below a year ago. Wholesale grocers are still carrying only as many weeks supply as in the prewar year 1941.

Retail inventories on a tonnage basis were slightly above 1947 on August 1, when surveyed by the A. C. Nielsen Co., market research organization. But they were only 11 percent above the 1942 level, while tonnage sales had increased 23 percent on the same basis. The ratio of inventory to sales may have risen by the year end, but the stores do not appear overstocked.

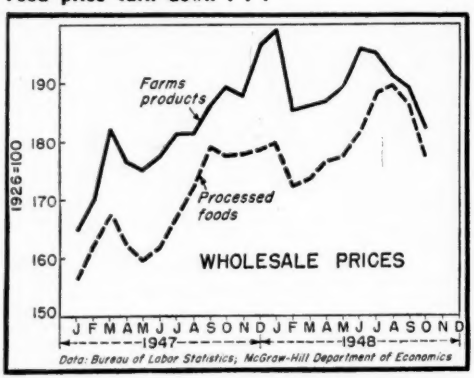
Thus, distribution channels are generally free of surplus foods, although particular items may be in oversupply. In fact, if lower food prices do lead to higher unit consumption, distributors' inventories may have to be built up to enable them to carry the higher volume.

Costs Still High

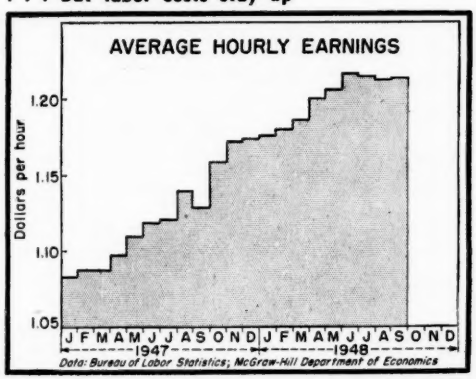
Since sales of food processors will probably be lower in 1949, the ques-

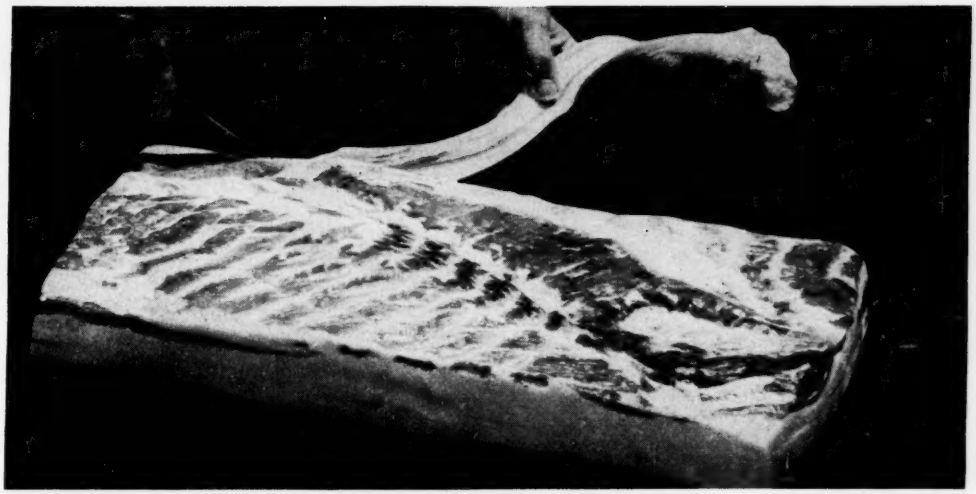
(*Turn to page* 193)

Food price turn down . . .



. . . But labor costs stay up


AVERAGE HOURLY EARNINGS
Dollars per hour
1.20
1.15
1.10
1.05
J F M A M J J A S O N D J F M A M J J A S O N D
1947
1948
Data: Bureau of Labor Statistics; McGraw-Hill Department of Economics



Tests on Bacon Point Way To Keep It Fresh in Cans

Investigations at Hormel Institute reveal that key factors in commercial applications are dehydration, curing, smoking, and type of cans

JOHN A. ULRICH
Research Associate, The Hormel Institute
University of Minnesota, Austin, Minn.

Canned bacon with a freshly smoked flavor-quality—even after storage at 100 deg. F. for more than 10 months—is the encouraging result obtained by the Hormel Institute, University of Minnesota, in its research project sponsored by the Quartermaster Food & Container Institute.*

The final product has an average moisture content of about 7 percent, an average NaCl content of about 2 percent, and a protective anti-oxidant. It has the flavor and appearance of freshly smoked bacon.

This experimental accomplishment is significant technologically for the present, and it has commercial possibilities for the future. Long before the outbreak of World War II, the need for a method of keeping bacon in an edible state during prolonged, non-refrigerated storage was well recognized.

This need was accentuated by the problem of feeding the Armed Forces during the war. It has stimulated the study of methods and technics of bacon processing and handling to obtain a final product which would largely, if not fully, retain its freshly smoked flavor during storage and despite handling under adverse conditions.

Some of the Problems Faced

American bacon presents a number of special problems on keeping properties. Since it consists of a high percentage of fatty tissue, development of rancidity is a problem of major importance. Even at temperatures below freezing, it becomes rancid and inedible after several months' storage. Addition of anti-oxidants to slab bacon has not been encouraging. Many of those used do not penetrate readily into all parts of the slab.

Vacuum- or gas-packing have been two methods of overcoming formation of rancidity, but they do not eliminate the growth of micro-organisms which are normally present in the bacon. This deficiency of vacuum- or gas-packing imposes on bacon processors the special problem of inhibiting or stopping microbial activity.

Unlike many other perishables, bacon cannot be satisfactorily pasteurized or heat-sterilized. Heat-treating to a pasteurization or sterilizing level renders the fat from the bacon. Therefore, this complication necessitates other means of controlling microbial growth.

In the course of the studies at the Hormel Institute, bacon processed by a meat packer was used to eliminate some of the variables likely to be encountered in bacon processed by different packers.

Bacteria Changes in Processing

Work at the Hormel Institute began by determining the changes occurring in the bacterial contamination of sides of bacon during curing, washing, and smoking. A series of tests indicated that: (1) A domestic, commercial-type cure results in an approximate 20-fold decrease of bacteria in 18 days; (2)

Research Indicates That

- Drying to 7 percent moisture
- Adding of anti-oxidant, and
- Vacuum-packing

Will Keep Down

- Microbial growth
- Rancidity, and
- Losses in color and flavor

* This paper reports research undertaken in cooperation with the Quartermaster Food & Container Institute for the Armed Forces, and has been assigned No. 220 in the series of papers approved for publication. The views or conclusions contained in this report are those of the authors. They are not to be construed as necessarily reflecting the views or indorsement of the Department of the Army.

Laboratory Tests Show Effects of Various Cures

TABLE I—SPOILAGE Takes Place in Bacon With High Moisture Content.

Mild Commercial Cure, Vacuum-Pack, Average NaCl Content 1.39 Percent, Average Moisture Content 23.10 Percent

Incubation, Days at 100 Deg. F.	Micro-organisms Per Gram Plate Count	Lipolytic Count	Organoleptic Test
0	46,000	900	sound
10	14,500,000	5,000	slightly proteolytic
23	7,900,000	2,500,000	proteolytic
36	1,720,000	<5,000	proteolytic
107	<5,000	<500	proteolytic

TABLE II—BACON With Low Moisture Content Needs Higher Salt Concentration.

Very Mild Commercial Cure, 24-Hr. Lard-Oil Dehydration, Vacuum-Pack, Average NaCl Content 0.88 Percent, Average Moisture Content 13.20 Percent

Incubation Days at 100 Deg. F.	Micro-organisms Per Gram Plate Count	Lipolytic Count	Organoleptic Test
0	5,000	<300	sound
7	45,500,000	<300	sound
14	13,600,000	240,000	proteolytic
21	10,000,000	3,000	proteolytic
28	1,700,000	9,600	proteolytic
34	2,500,000	58,000	proteolytic

TABLE III—GOOD KEEPING QUALITIES Result When Bacon Has Higher Salt Concentration and Low Moisture Content.

Medium Commercial Cure, 24-Hr. Lard-Oil Dehydration, NDGA Treatment, Vacuum-Pack, Average NaCl Content 2.06 Percent, Average Moisture Content 7.20 Percent

Incubation, Days at 100 Deg. F.	Micro-organisms Per Gram Plate Count	Lipolytic Count	Organoleptic Test
0	1,380	<300	sound
22	<300	<300	sound
50	<300	<300	sound
109	<300	<300	sound
156	<300	<300	sound
205	<300	<300	sound
261	<300	<300	sound
305	<300	<300	sound

removal of excess curing agents by washing has no apparent effect on the number of bacteria; (3) an 18-hr. smoke after washing reduces bacteria to one-tenth the count found immediately after the curing process; (4) lowest bacterial count is found immediately following removal from the smoke-houses; and (5) additional contamination occurs during slicing and packaging operations.

Practically all of the micro-organisms present are bacteria—90 percent being micrococci, 7 percent spore-formers, and the remaining 3 percent *Lactobacilli.* Out of more than 600 isolations, only two were Gram-negative, coliform types. During six months of culturing stored bacon and bacon fresh from the smoke-house, only negative results were obtained in the isolation of yeasts, molds, and anaerobic bacteria.

Increased Salt Content Not Helpful

Previous studies had shown that the storage time for bacon could be lengthened by increasing its NaCl content, with the result that packers utilized this method in processing bacon for the Armed Forces during World War II. This method requires as much as 5 to 6 percent NaCl—an amount which is too salty and, therefore, objectionable organoleptically.

Tests at the Hormel Institute show that an NaCl content of 2 to 3 percent is most desirable both for storage and palatability. This salt content, however, has a disadvantage. It does not eliminate microbial growth at the normal moisture content of commercially cured bacon, even though it is vacuum-packed. But it could become effective by reducing the moisture content in the bacon.

Moisture Removal Problems

Removal of moisture introduced other difficulties. Dehydration by usual methods of drying at elevated temperatures renders the fat. Dehydration by freezing and thawing adversely affects the tissue structure. Application of vacuum in ordinary vacuum chambers results in case hardening, even at temperatures below the melting point of bacon fat. Also, moisture entrapped in fatty tissue is difficult to remove, even at less than atmospheric pressures.

Other research workers have tried increasing pressure on bacon slabs during the curing treatment, as well as alternate freezing and thawing under pressure. These treatments, however, resulted in only slight reductions in the moisture content.

When drying in vacuum chambers failed to reduce the moisture content sufficiently, heating of the slabs in melted lard gave good results. The temperature of the melted lard was maintained below the rendering point of bacon fat (under 130 deg. F.). The lard used was fully melted at 110 deg. F. With the type of equipment employed, it took 24 hr. to obtain a final moisture content of about 7 percent. The anti-oxidant, nordihydroguiaretic acid, was added to the melted lard to give the finished bacon an NDGA content of 16 to 20 ppm., by weight.

The melted lard method of drying has several advantages, in that when melted it: (1) Penetrates the lean portions and helps to keep the bacon soft at low moisture levels, (2) aids in distributing the anti-oxidant throughout the slab, and (3) drains freely from the slab so that the amount remaining is unobjectionable.

Smoking tests show that the longer the smoking period, the longer the bacon will keep. However, smoking for too long a period results in undesirable organoleptic changes and may materially darken the natural pink color of properly cured bacon. The bacon absorbs a greater amount of smoke during prolonged smoking than may prove to be palatable.

Skinning of the slabs before smoking was attempted in the hope of getting a better penetration of the smoke in order to obtain the benefits of a longer smoke in a shorter period of time, without undesirable organoleptic and physical changes. For some unexplained reason, the skinned slabs did not keep as well as those with the skin left on during smoking.

The Hormel Institute study included various methods of canning to determine whether vacuum-pack, CO_2-pack, or nitrogen-pack gave the best results. The experimental packs were put in either 24-oz. cylindrical cans or in 20-oz. D-shaped cans commonly used for quarter hams.

Chemical Changes During Storage

During long storage there was usually little change in chemical composition of bacon that kept well. As a result of the activity of tissue enzymes normally present in pork, free fatty acids continued to increase slowly, in all samples, until an upper limit was reached. Enzyme activity then ceased, with no influence on the soundness of the bacon.

There was no change in pH, peroxide value, or NaCl content. Good samples showed no change in free ammonia nitrogen which, however, was formed quite rapidly in samples which were not properly treated. The nitrite nitrogen content gradually decreased in bacon samples which kept well and also in the samples which did not keep as well. Kjeldahl nitrogen varied with the leanness of the bacon and bore little, if any, relation to the stability of the bacon.

Tables I, II, and III show the microbial changes in vacuum-packed bacon with different levels of salt and moisture content, and with and without NDGA. The data in Tables I and II are typical for bacon that spoils under

(*Turn to page* 186)

STEAKS are cut from the whale on the flensing deck of the **Balaena**, to be frozen and kept in refrigerated storage.

Whale Meat

The British are now being won over to it since quality has been improved by better processing methods of Antarctic expeditions

McGraw-Hill World News*

Prospects look good for the increased production of whale meat in the Antarctic for consumption in Great Britain. Last spring the whaling fleets brought back a total of 4,000 tons of whale steaks from the 1947-48 season's activities. Consumer reaction is becoming increasingly favorable, since the meat from the Antarctic is all of the first grade, reported to taste like a blend of liver and steak.

Last season the United Whalers, Ltd., owner of the factory ship *Balaena*, added a refrigerating vessel to the whaling fleet. This year a second reefer ship, the 8,000 ton *Bransfield*, will bring back an additional 3,000-4,000 tons of meat.

Additional impetus for increasing production is found in the technological advances through the studies by the Department of Scientific & Industrial Research. Three scientists accompanied the *Balaena* on several of her trips to study the problems of color variations and of a fishy or oily taste in the meat.

* Additional material was obtained from a paper by Ian Cox, Science Editor of the British Broadcasting Co. Photo courtesy of the J. Arthur Rank Organization.

Problems Investigated

Color, which ranges from a pale pink to a dark liver shade, appears to be associated with the type of whale and with its age. Darker meat comes from older whales, and the color

would indicate quality only as to tenderness or toughness.

The investigators have found that "oiliness" is due to oxidation of the fat, and that it can, to a large extent, be eradicated by removing all fat from the steaks before storing.

The condition of "fishiness" is more difficult to control. Investigations have shown that it is sometimes associated with the microorganisms which may eventually produce putrefaction. This is difficult to arrest because the catching vessel may kill and flag a considerable number of animals before towing them to the factory ship. After death of the whale, the intestinal bacteria begin to invade the tissue, where they multiply. Multiplication is speeded by "heating," if the harpoon shot is not immediately lethal and the whale thrashes violently.

Immediate Treatment

Methods of solving this problem are being devised. Harpooning practices are being improved, and a point is made of dealing with the "meat" whales immediately on their arrival at the factory ship. Although oil is still the primary product of the whaling expeditions, the "oil" whales can wait without reduction in the quality of oil.

It has been found that slitting the belly wall as soon after death as possible results in greatly improved quality by reducing the undesirable fishy taste. Cold sea water is admitted and rapid cooling occurs.

A rapid test has been developed for measuring the ammonia content of the meat to determine the number of organisms, while flensing is still in operation on the flensing deck. In this way, undesirable meat will not be taken to the meat deck, to which the satisfactory steaks are transferred.

The steaks are packed and frozen in much the same way as was South American beef during the war. A vacuum pipe, put on the bottom of a wedge-shaped mold, sucks the meat into close contact with the mold. Then brine at −15 deg. F. is run in. The meat freezes in 3½ hr., after which warm brine is injected and air pressure applied to release the vacuum.

The frozen meat slips out of the molds in 50-lb. blocks, which are packed in sets of two. One ton of meat will occupy 50 cu. ft., which makes the additional refrigerated storage capacities of the fleet's two new ships a real necessity.

Cuts of a whale, which are most satisfying for table meat come from four long muscles located beside the backbone, both above and below the ribs. When cut transversely, these correspond to the upper-cut and undercut of a sirloin of beef. Whale meat can be prepared by the consumer as steaks, roast, stew or hamburgers.

High Quality Meat

The British housewife had earlier been turned against the use of this meat because of disappointment in inferior grade importations from Norway. But the high quality of the present supply is succeeding in winning her confidence and the market is growing. The fact that whale meat is not rationed is a clinching argument for its popularity.

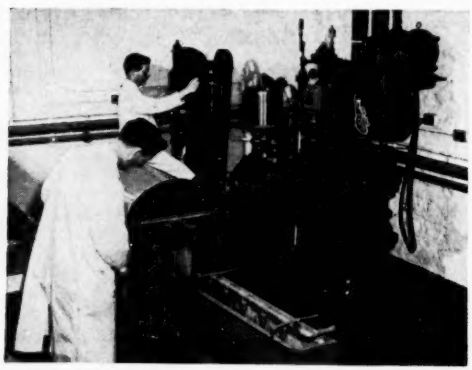
Research is continuing on the problems of handling the meat aboard ship —of determining and maintaining freshness. It is likely that in the near future more disclosures will be made on the studies being conducted. New regulations, also, may be issued by the DSIR Food Investigation Board.

Pilot Plant Research To Aid Food Processors

Industry and N. Y. State Agricultural Experiment Station to collaborate in tackling various food processing problems

TWO hundred research and key production men of food processing industries of New York state recently held their first meeting at the state Agricultural Experiment Station to review the research program underway there. Although the work will be primarily on problems of regional interest, the results will undoubtedly be applicable in many parts of the country.

To help in bridging the gap between factory and laboratory conditions, the research program is using processing lines built on pilot plant scale. Two such lines are already installed. One is for research on canning and freezing of fruits and vegetables and the other for processing and canning tomato juice. These lines, and others still in the planning stage, are replicas of large-scale commercial operations.



BLANCHER (left) aids pilot plant study of commercial problems. Two types of can-closing machines (shown in rear) are used in experimental work in canning.

Pilot plant work will be slanted toward studies of variety and maturity, improvement of processing methods and development of new products.

Some of the equipment is, by necessity, custom-built, handling from 300 to 500 lb. of raw material per hour. The units, being small in size, can be mounted on casters, allowing interchangeability and flexibility in equipment used in the various studies. Suitable metering and control instruments are to be installed.

Cooperative Program

The research at Geneva is being organized on a cooperative basis and will make use of the combined efforts of biochemists, organic chemists, bacteriologists, physicists and engineers. Collaboration with industrial processors is felt to be a definite responsibility, to assist in practical application of scientific knowledge.

Dr. David B. Hand, head of the station's Division of Food Science & Technology, describes the long-range program as having three major objectives: (1) Improvement in raw materials, (2) improvement in nutritional value and in flavor of processed foods, and (3) reduction of cost.

INTRODUCING:

Food Industries Picture-Flowsheets

To better serve the needs of our readers and to foster engineering progress in the food field, FOOD INDUSTRIES is introducing a new regular feature in this issue. It is the large picture-flowsheet of the type presented on the following fold-out pages.

Flowsheets have appeared frequently in FOOD INDUSTRIES' articles, but these have been limited in size by the space restrictions of the standard page. With the new fold-out presentation, there will be ample space to reveal details clearly. And it will be possible to tie pictures directly to the flowsheet to illustrate key units of the process.

These picture-flowsheets are in reality an extension of our coverage of advanced food plant engineering. They will portray, by conventionalized drawings and by pictures, modern processing lines for food products.

In keeping with FOOD INDUSTRIES' regular coverage of developments in the various branches of the industry, the continuing series of picture-flowsheets will show processes for many different products. And as the months pass, readers will accumulate a comprehensive group of flowsheets of food processes.

Look For Ideas You Can Borrow

Now, a suggestion as to what to look for in these picture-flowsheets. There are a multitude of unit operations and processes common to food plants in general. So a flowsheet of a process in one industry will show advanced techniques which have application in other industries. Whatever your particular branch of the industry, you can to advantage study each flowsheet for ideas and information useful in your business. This interchange of ideas between branches of the industry accelerates progress at a much greater rate than would be possible if all advances had to originate in one branch of the business.

As a tip to management, we suggest that someone be assigned in your plant to the interesting and rewarding task of studying each and every step in each of your operations and processes to determine where improvements can be made. Men who do this sort of thing must, of course, have a good background of knowledge as to advanced practices in processes and operations of the type portrayed in the flowsheets. Sometimes methods may be borrowed from another industry and applied directly. In other instances they will suggest a new approach to a particular processing problem.

To newcomers in the food industries who want to increase their knowledge as a prelude to a still better job, we suggest that the operations presented in these flowsheets be studied thoroughly. The need is great for technical men with a broad, as well as deep, knowledge of food engineering and technology. This is particularly true in view of the trend among food companies to multi-product operation.

Advanced Engineering Will Cut Costs

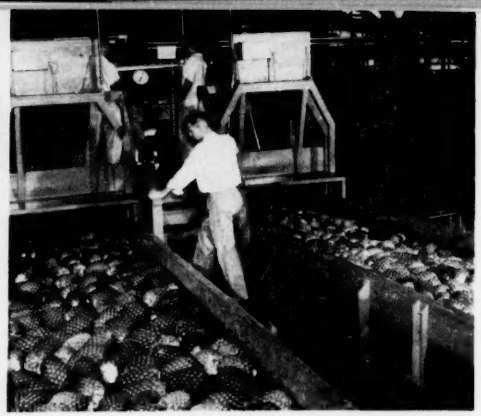
Progressive people in the food industry feel that too much attention cannot be applied to advanced food plant engineering, as typified by methods to be shown on these fold-out flowsheets. One reason is the pressing need to reduce operating costs so as to help compensate for the high cost of labor, raw materials and freight. A second reason is the desire to improve quality and to put it on a more uniform basis so that consumers will continue to buy a particular brand. Then, too, leaders in the industry like progress for progress' sake.

A word about the flowsheet in this issue, which shows Hawaiian Pineapple Co.'s operations. This company has made considerable technical progress, its achievements being so many and so significant that FOOD INDUSTRIES sent one of its editors to Hawaii to obtain the details. To tell this interesting story requires many words, so the picture-flowsheet is supplemented by text elsewhere in this issue. This all-out type of treatment will be followed in other instances in the future. But many times it will be possible to describe a process in the space available for text on the flowsheet itself.

The Hawaiian Pineapple flowsheet is unusual in that it is drawn in perspective to show the relationship between different departments of the plant. Most flowsheets in future issues, however, will be of the conventional side-elevation schematic type, with standardized equipment sketches.

Readers are invited by FOOD INDUSTRIES to comment upon this fold-out picture-flowsheet arrangement. And we particularly welcome suggestions as to processes which you would like to see illustrated by this technique. **—The Editors**

STRADDLE-TRUCKS unload bins of fruit from plantation trucks and transfer them to the dumping stations.



SPEED of 48-in. belts and diversion devices feeding distribution belts is controlled from this station.

Pineapple Canning

(Article on page 53)

HAWAIIAN PINEAPPLE CO.'S huge plant utilizes advanced processing methods and equipment. Pineapples are delivered to the production lines by straddle trucks which carry 7-ton bins. Hydraulic tilters empty the bins onto slat conveyors.

Gravity rollers carry the empty bins across the dumping station to be picked up for return to the fields.

Pineapples travel to specially designed graders, the classified fruit dropping to 48-in. belts which deliver it into the cannery.

Inside the cannery, graded fruit passes to its respective belt-distribution system. Control of these belts feeding the preparation lines is from a central station. Automatic deflection arms divert pineapples from the belts into chutes leading to the "ginaca" machines. These speedily transform the thick-skinned pineapples into uniform cored cylinders.

Belts from the ginacas deliver the cored cylinders to 20-foot. stainless-steel trimming tables. Trimmers inspect and remove bits of skin, then cylinders enter the slicer.

A chain conveyor delivers the slices to stainless-steel packing tables where they are inspected, graded and packed. Some of the slices are cut into chunks and tidbits and canned automatically.

Filled cans now go to a prevacuumizer, which breaks down the air cells in the fruit, enabling sirup to penetrate and insure a more uniform color. After the sirup is added volumetrically, the cans are closed in vacuum double seamers and brought to 190 deg. F. in rotary pressure cookers. Large vertical coolers, supplied with water from artesian wells, rapidly cool the cans.

Cardboard containers are made by the company. Box factory production is coordinated with casing and sealing. Cartons are filled automatically.

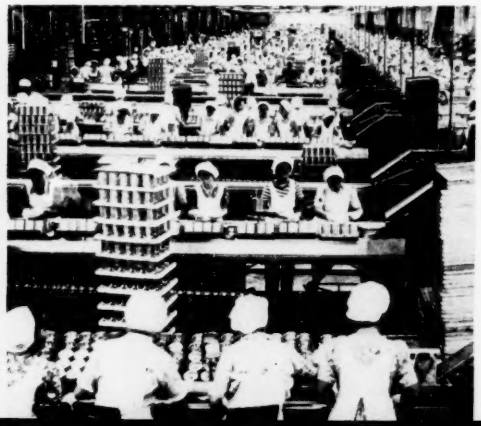
Making byproducts from portions of the fruit not suitable for canning constitutes a sizeable operation. Bran is made from shells, ends and trimmings. Shredded, pressed and dried, it is converted into feed. Juice from the presses is treated and recovered as citric acid crystals.

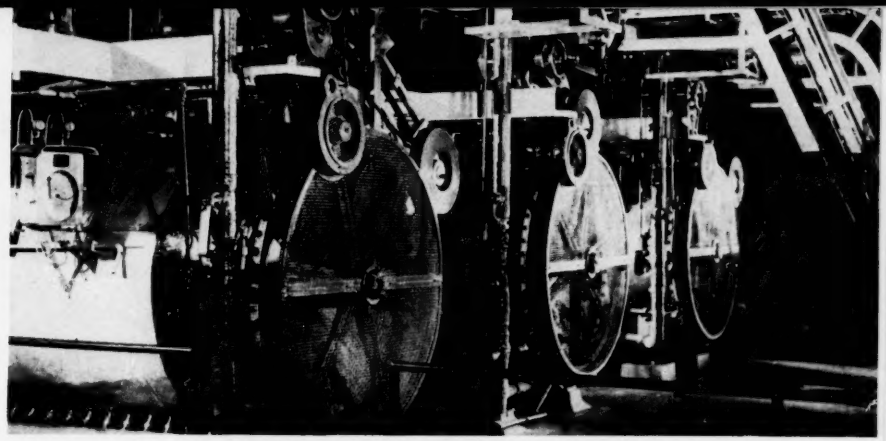
After removal of citric acid, the juice is pumped to an iron exchange plant. About 4,000 tons of sugar are recovered annually.

FOOD INDUSTRIES *January 1949* PAGES 83-90

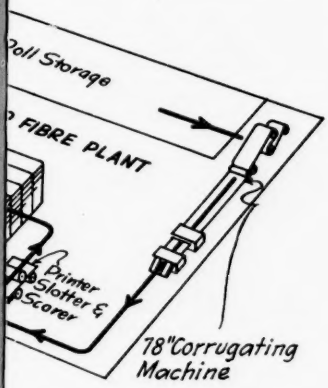
GINACA MACHINES transform the thick skinned pineapples into uniform cored cylinders, discharging into Y chutes.

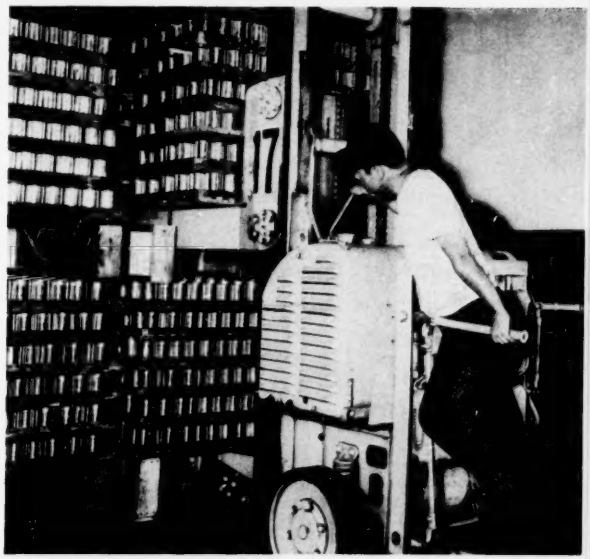
DAY-SHIFT at peak of pack season may require as many as 1,500 girls on the 48 trimming and packing tables.





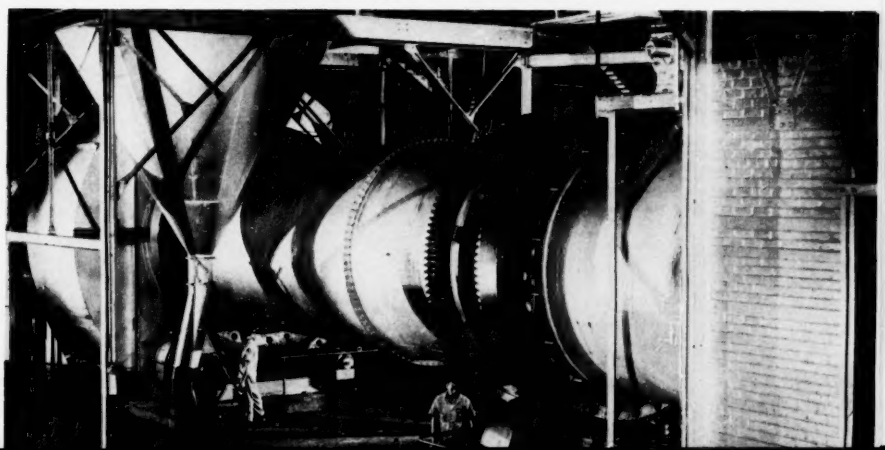
THREE of the 46 continuous pressure cookers in operation in the cannery are shown. Here, the cans are brought to a temperature of about 190 deg. F.

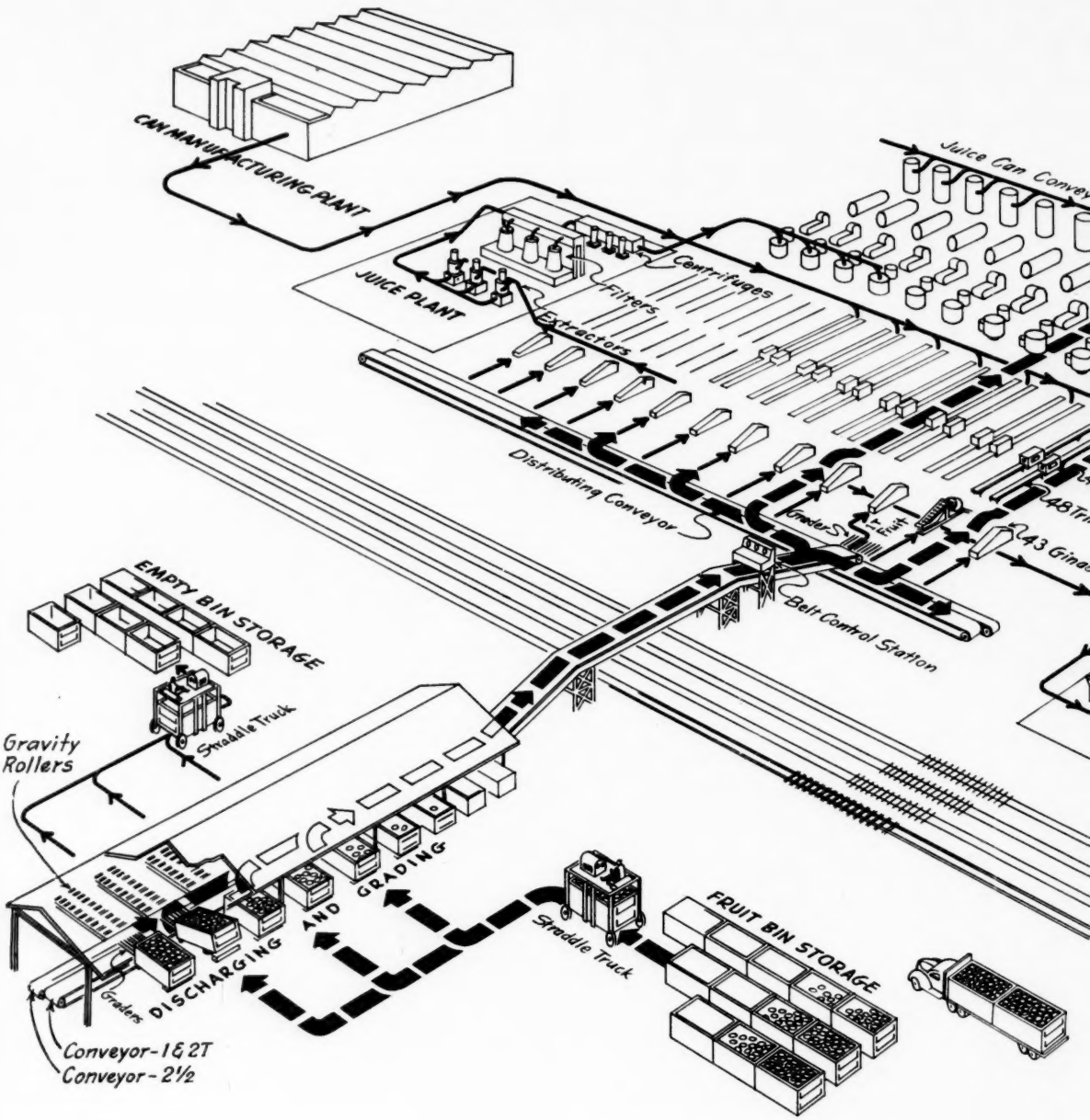


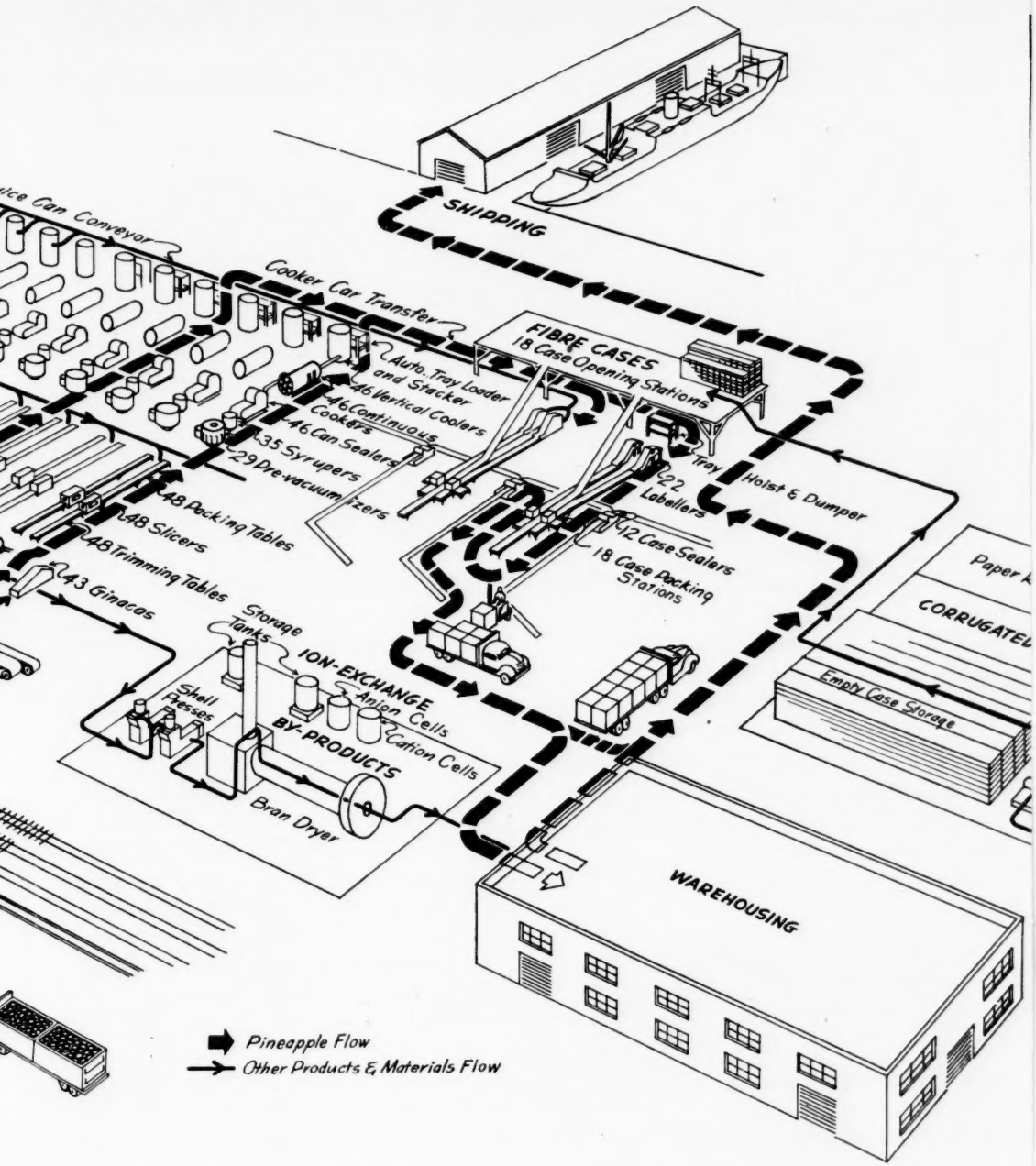


LIFT-TRUCK moves solid items of pack from stackers to adjacent cooling rooms for additional cooling.

ROTARY DRYER in which pineapple bran is dehydrated. This byproduct, made from shells and trimmings, is a staple livestock feed in Hawaii.




CAN MANUFACTURING PLANT
JUICE PLANT
Centrifuges
Filters
Extractors
Juice Can Conveyor
Distributing Conveyor
Belt Control Station
EMPTY BIN STORAGE
Straddle Truck
Gravity Rollers
GRADING AND DISCHARGING
Graders
Conveyor-1&2T
Conveyor-2½
Straddle Truck
FRUIT BIN STORAGE



PLANT ENGINEERING

ture-Flowsheet 1

"COOLIE" CONVEYING IS COSTLY

You need "tools" to cut the cost of handling packages—cartons, cases, boxes, barrels, bags.

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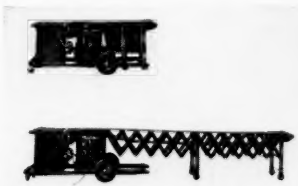
HANDIBELT—Portable all-purpose, self-contained, electric powered (110 V.—A. C.) reversible belt conveyor unit. Belt inclines or declines at adjustable heights. Handles all types cartons, cases, bags or boxes. Fits in crowded aisles, cars, trucks, elevators.



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INCLINEBELT—Reversible belt powered unit for between-floor handling of boxes, bags, cases or cartons. Ideal for multi-floor warehousing or shipping and receiving areas. Two belt widths available—14 inch and 24 inch.

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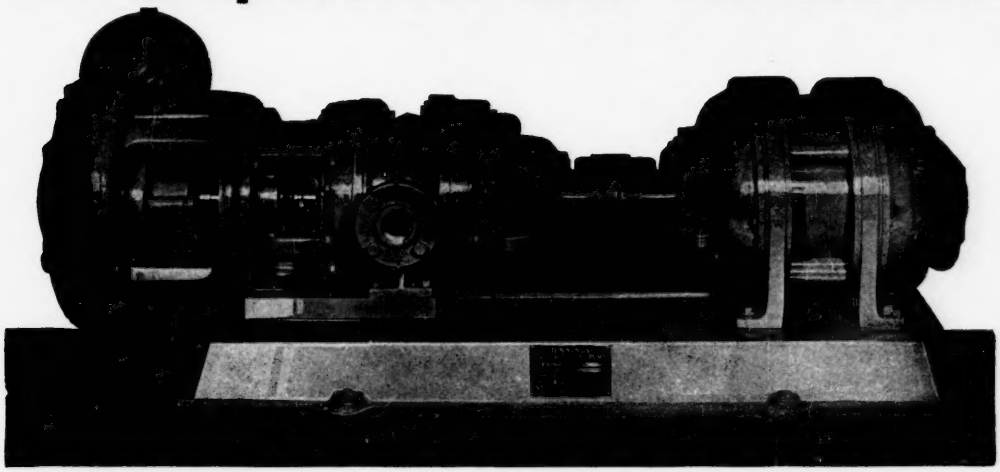
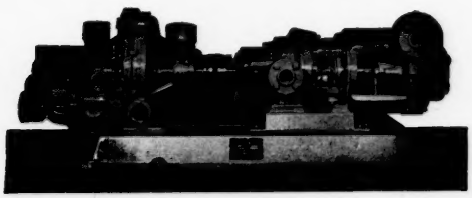


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.

NASH ENGINEERING COMPANY

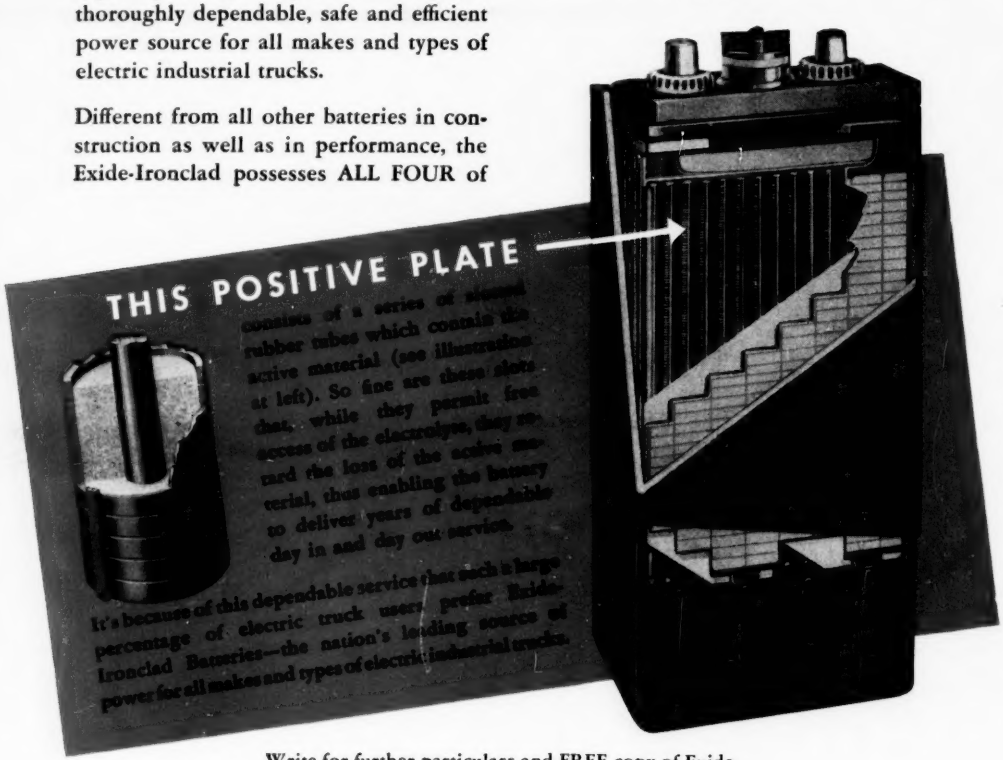
SOUTH NORWALK • CONNECTICUT, U. S. A.

USERS EXPRESS PREFERENCE FOR Exide IRONCLAD BATTERIES

Electric industrial truck users have frequently expressed a preference for Exide-Ironclad Batteries . . . the batteries that assure peak performance day after day.

Such overwhelming preference for the Exide-Ironclad Battery is based upon user experience. This unique battery has, during the past 35 years, proved itself to be a thoroughly dependable, safe and efficient power source for all makes and types of electric industrial trucks.

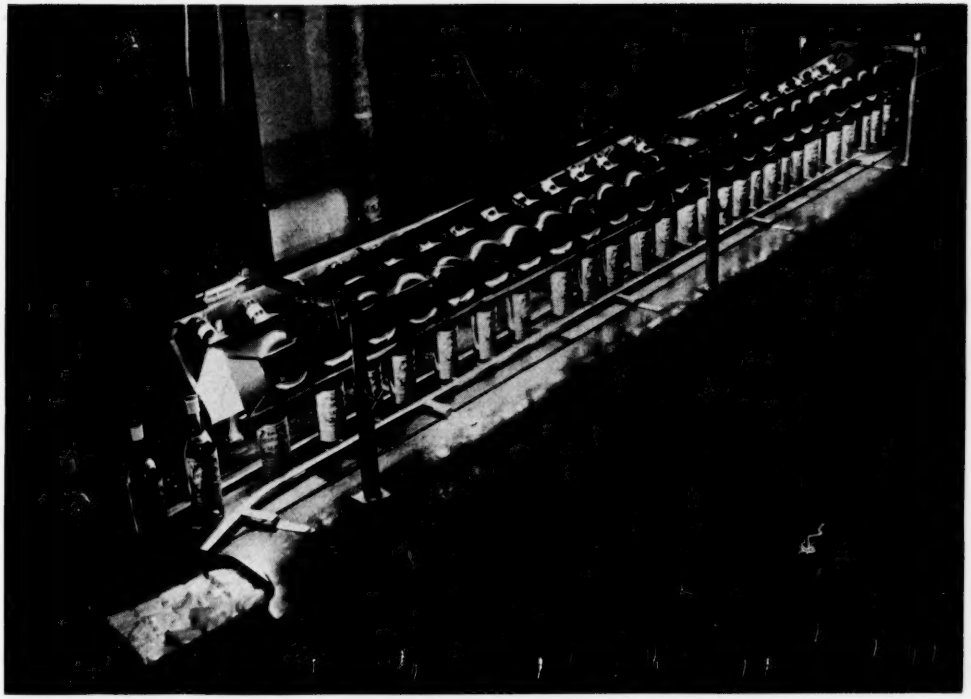
Different from all other batteries in construction as well as in performance, the Exide-Ironclad possesses ALL FOUR of the essential characteristics demanded of a battery for electric industrial truck service—(1) high power ability, (2) high efficiency, (3) great ruggedness, and (4) long life. These characteristics are due to the special construction of the Exide-Ironclad Battery, especially its rugged, tubular positive plate.


THIS POSITIVE PLATE
consists of a series of slotted rubber tubes which contain the active material (see illustration at left). So fine are these slots that, while they permit free access of the electrolyte, they retard the loss of the active material, thus enabling the battery to deliver years of dependable day in and day out service.
It's because of this dependable service that such a large percentage of electric truck users prefer Exide-Ironclad Batteries—the nation's leading source of power for all makes and types of electric industrial trucks.

Write for further particulars and FREE copy of Exide-Ironclad Topics, which covers latest developments in material handling and shows actual case histories.

1888...Dependable Batteries for 61 Years...1949

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto



This Infra-Red Sealer facilitates high-speed bottling in winery by pre-forming and hardening forty to fifty cellulose bottle-top bands per minute

F. I. STAFF REPORT

An infra-red sealer, that reduces to 29 sec. the time for pre-forming and hardening cellulose bands on wine bottles—an operation which formerly required up to 2 hr., according to relative humidity conditions within the plant—is now in operation at the Italian Swiss Colony Winery (Shewan-Jones, Inc.) Lodi, Calif. This winery formerly used a heated wind tunnel for shrinking the bands.

Cellulose bands are used as seals on a number of glass packaged products. Most significant advantages are that they hold screw caps and corks firmly in place, prevent leakage, improve sanitation, and have great advertising and decorative values.

The use of these bands in many branches of the food and beverage industry has been impeded, however, by the time and equipment required to pre-form them to the glassware. In wineries, for example, bottles are conveyed through long tunnels in a direction counter to a blast of heated air. As long as two hours is required to pre-form and seal the cellulose bands.

The spectacular saving in time may open new avenues for the use of cellulose bands and caps on bottles and jars. And the speed of operation made possible by this machine may make the use of cellulose seals economically feasible in other branches of the food and beverage industry.

The Weulker Infra-Red Sealer consists of an adjustable rack 12-ft. long, having four adjustable channels with pure copper baffles and guides. The channels can be raised or lowered to accommodate bottles of different heights and sizes. Heat is supplied by 46 R-40, 375w. infra-red lamps, which are staggered on 6-in. centers, 23 lamps to the side.

Reflectors are built in these lamps and, in addition, the copper baffles reflect the rays from the lamps on the opposite side of the bottles onto the seals, thus further saving heat.

Cellulose bands, as received, are packed in liquid in pails. Operators drain the liquid from the bands and slip them over the tops of the bottles, leaving a slight overlap at the top. Bottles are then placed on a belt conveyor which carries them into the sealer. Guides, located just above the conveyor, direct the bottles into the opening between lamps.

Two other guides, located on the bottom of each copper baffle, fit snugly against the necks of the bottles, preventing unnecessary motion. Held firmly by these guides, the bottles, with moist seals appended, travel through the heating area. Lamps are located at a distance of about 1½ in. from bottle necks.

Focused directly on the necks of the bottles, the infra-red lamps develop a temperature of approximately 500 deg. F. Bottles are exposed to this heat for only 29 sec. as they are carried the length of the heating area on the conveyor. There is no evidence that the product itself has been heated or harmed in this short period of time.

The capacity of this sealer is about 40 to 50 bottles per min. Upon emerging from the sealer, the cellulose bands have been pre-formed and hardened and can be safely handled. Bottles may be cased and shipped immediately.

VITAMIN VALUES in canned foods are pointed out by Dr. E. J. Cameron of NCA.

Survey Shows High Nutrient Levels in Canned Foods

Joint National Canners Association-Can Manufacturers Institute research program yields essential data on vitamins, minerals, other constituents

FOOD INDUSTRIES STAFF REPORT

Food canners were told in Chicago in November that "we know more about the nutritional values of canned foods than is known about any other type of processed food." The statement was made to the directors of the National Canners Association in a progress report on the important nutrition program sponsored by the NCA jointly with the Can Manufacturers' Institute. The speaker was Dr. E. J. Cameron, Director of NCA's Washington Research Laboratories, who heads the committee responsible for the comprehensive program of research which is now in its seventh year.

The NCA-CMI nutrition program divides into two phases. Phase I deals with the nutrients found in foods after canning. It has yielded basic data important for the grower, processor, distributor, consumer. Phase II, now being intensified, includes "plant improvement" studies undertaken to find ways to improve methods and equipment to the end of greater nutrient retention.

Phase I work, on the nutrients present in average portions of various canned foods as now prepared under good practice, has, as one outcome, detailed tables on vitamin and mineral content, of unimpeachable accuracy, which are invaluable for reference in processing foods as well as in planning meals. They have been printed in abridged form and are available for distribution.

Detailed results of the research program are presented in tabular form in this article, as a service to processors. The data will serve as guides whenever it is proposed to draw attention to nutrient values of canned products in labelling or advertising. The information will be helpful also whenever the advisability of enrichment is under consideration.

Recognizing the importance to the general public of the comprehensive new nutritional data, the NCA arranged at the Chicago meeting for a dramatic presentation of the value, methods and results of its program. This campaign has already had its effect in increasing the nutritional awareness of the consumer.

In presenting the findings to the NCA directors, Dr. Cameron referred to the start of the program in 1942, in part a consequence of the National Nutrition Conference held in Washington in 1941. This conference emphasized weak spots in the national nutrition pattern, and recommended studies of the nutritive factors of existing products as well as investigations that would lead to improved nutrition. The joint NCA-CMI program was shaped to these specifications. It had the further objective of supplying for canned foods information needed by the armed forces.

Reviewing the research to date, Dr. Cameron said in part: "Samples of more than 40 non-formulated products were collected in 1942 and 1943 and assayed for six vitamins, three minerals, fat, carbohydrate and protein. The samples of fruits, vegetables, and fish were taken from all of the large production areas to obtain complete geographical coverage. The assays for nutrients were conducted in universities selected for the project.

"In these studies, a total of more than 40,000 assays were made, and the test materials comprised more than 50,000

BIOASSAYS gave data on ascorbic acid.

cans of food." A total of 526 canners were sampled in the course of the work.

Process Improvement

In the Phase II part of the program, aimed at "plant improvement", products have been followed step-by-step from the time they reach the cannery to the final processing operation. Also considered have been storage effects under conditions of controlled temperature and in commercial warehouses. In final preparation is a report on a two-year temperature survey of 59 warehouses located in representative parts of the country.

Thus far, the National Canners Association and the Can Manufacturers Institute have together set aside $256,000 for the support of the work. Of this sum, $126,000 has gone for the nutrition grants. About $75,000 has been spent over a six-year period on salaries, purchase of samples, expressage, travel, expenses of meetings and other items. There is still $55,000 in the nutrition reserve fund. Some of the nutrition research reserve will likely be used for further work on amino acids, which are attracting increasing attention from the nutritionist.

A first year's study of amino acids in meat and fish products is nearly completed. Products have been assayed in the raw (frozen) and canned condition. Assays have been made on luncheon meat, whole boned ham, sardines, tuna, salmon, mackerel and fish flakes.

Said Dr. Cameron of the amino acid investigation: "The Nutrition Committee is hopeful that the initial findings will justify further exploration into the field of amino acids in canned foods. This is a newly-developed branch of nutrition, and we may look for valuable information from work on high protein canned products."

Other Problems

Among other current problems on the nutrition program are observations on the effect of holding blanched products prior to filling, and the study of storage stability of ascorbic acid in tomato products.

Just completed is a study of carbohydrate balance in syrup-packed fruits. Its purpose was to determine whether in canned fruits the sugar will equalize between the product and syrup. There is substantial equalization, Dr. Cameron indicated. If this is confirmed, hospital dieticians can be provided with directions for the easy determination of the amount of sugar in a serving of fruit and syrup where special diets are involved.

A research problem under consideration for the future is a study of sodium in canned foods, Dr. Cameron indicated in his discussion of the nutrition research. He said: "There has been an increasing literature on low salt diets and it has been stated that without rigid restriction of salt, many patients with heart failure do not improve despite other therapeutic measures."

A few canners pack dietetic foods to which no salt or sugar has been added. Possibly the availability of such foods should be extended because canning is an ideal method of distribution for such products.

"In our nutrition program," explained Dr. Cameron, "we do not intend to include nutritional research in the field of medicine, but if there is substance in the claim that low sodium foods are necessary in the control of certain ailments, it would be to the advantage of the canning industry to know something about the sodium content of its products."

Under these circumstances, it may be predicted that there will be growing demands for canned products without sodium.

Publicity Program

An indication of the broad scope of the nutrition program is the list of technical reports published thus far. Scientific journals have published 26 manuscripts, with 15 more in preparation or accepted for publication.

NCA's Home Economics Division has been active in translating the findings of the program into terms most useful for home economics workers, teachers and others. Ten advertisements were prepared in 1946, the last three of which appeared the first three months of 1947.

A new unit of advertisements was prepared in 1947, three pages appearing then and a fourth in January 1948.

TABLE I—VITAMIN CONTENT OF 15 CANNED FOODS—Percent of recommended daily allowance supplied by 100 gram portions for male adult of moderate activity

	Ascorbic acid		Thiamin		Carotene		Niacin		Riboflavin	
	Mg./100g.	Percent	Mg./100g.	Percent	Mg./100g.	Percent	Mg./100g.	Percent	Mg./100g.	Percent
Asparagus, green	15.2	20.3	.067	4.5	0.31	10.3	0.85	5.7	.096	4.8
Beans, green, cut	3.2	4.3	.029	1.9	0.18	6.0	0.32	2.1	.034	1.7
Beets	2.0	2.7	.008	0.5	0.006	0.2	0.13	0.9	.025	1.3
Carrots	2.0	2.7	.021	1.4	7.16	239.0	0.34	2.3	.021	1.1
Corn, yellow, whole kernel	4.2	5.6	.026	1.7	0.09	3.0	0.77	5.1	.044	2.2
Grapefruit juice	33.8	45.1	.025	1.7	0.007	2.3	0.17	1.1	.019	1.0
Orange juice	39.4	52.5	.072	4.8	0.08	2.7	0.25	1.7	.022	1.1
Peaches, clingstone	3.9	5.2	.007	0.5	0.26	8.7	0.70	4.7	.022	1.1
Peas, sweet	8.8	11.7	.115	7.7	0.26	8.7	1.06	7.1	.054	2.7
Pineapple juice	8.5	11.3	.052	3.5	0.03	1.0	0.18	1.2	.018	0.9
Spinach	11.4	15.2	.020	1.3	3.16	105.0	0.30	2.0	.082	4.1
Tomatoes	16.5	22.0	.049	3.3	0.58	19.3	0.69	4.6	.028	1.4
Tomato juice	12.9	17.2	.049	3.3	0.51	17.0	0.75	5.0	.028	1.4
Salmon	....	....	.021	1.4	0.060**	4.0	7.81	52.1	.16	8.0
Tuna	....	....	.037	2.5	0.008**	0.5	10.2	68.0	.14	7.0

*Thiamin hydrochloride. **Vitamin A.

Nutritional Improvement

This is the fifth article in the Food Industries current series on the nutritional improvement of foods. In the introductory article (September 1948) the possibility of process improvement was discussed, as one of the ways to insure a higher level of essential nutrients. The case for fortification or enrichment was examined also. The detailed information on the nutrients of canned foods, in this month's article, will serve as benchmarks for the processor surveying this general problem.—The Editors.

Publications Available

National Canners Association is actively publicizing the results of the nutrition research it is sponsoring jointly with the Can Manufacturers Institute. Data on nutritive values are summarized in a chart entitled "Canned Food Tables", released October 11, 1948. An example of the literature prepared for getting the story across to the consumer is a bulletin, "Canned Foods in Modern Meals", prepared by NCA's Home Economics Division.

COLLABORATING INSTITUTIONS LISTED

Location and Number of Nutrition Grants

Location	Number of Grants
University of Arizona	1
University of Wisconsin	7
University of Texas	1
University of Chicago	4
University of Maryland	4
Pennsylvania State College	5
Michigan Agri. Exp. Station	2
New York Agri. Exp. Station	2
University of California, L. A.	1
Total	27

Among the highlights of the new nutritional knowledge clarified by the ambitious research program are the following:

1. High ratios of vitamins, minerals and calories are retained in canned foods packed for standard commercial use.

2. Normal dietary requirements for nutritional factors supplied by cooked foods of various types may be met through selective use of canned foods with special characteristics in terms of calorie, vitamin and mineral content.

3. On-the-spot processing of fresh products, as practised in the commercial canneries, plus application of standardized quality control methods, retains relatively large amounts of essential nutrients, in contrast with many types of home cooking which disperse nutritive elements or destroy essential elements by overheating. The research illustrates the fact that a can actually functions as a miniature pressure cooker.

4. Protection of heat-sensitive nutritive elements, notably thiamin and vitamin C, may be fostered indefinitely in canned foods by avoidance of high-temperature storage conditions.

5. The new nutrient tables, with precise national averages for 42 staple products most widely in demand, provide the soundest basis for controlled medical and institutional use of canned foods that has thus far been developed.

6. Notable improvements in food research methods have been effected, through development of standardized techniques to compensate for seasonal and geographic variables and eliminate non-uniformity of research methods (a weakness that has limited the reliability of past research data on both canned and raw foods).

One of the most significant tabulations resulting from the completed Phase I of the nutrition work is the calculation of the share of the daily vitamin requirements which may be derived from canned foods, shown in Table I. As with much of the data, the vitamin content is related to 100 gram portions of the food, selected as a convenient round-number amount, approximating an average serving.

A detailed analysis of vitamin content in fish (Table II) and in fruits and vegetables (Table III) reveals the vitamin distribution pattern in different sorts of canned foods.

The protein, carbohydrate and fat values of many canned foods are established accurately (Table IV) as are the calcium, phosphorus and iron levels (Table V).

How Vitamins Are Distributed

TABLE II—VITAMIN VALUES OF SOME COMMERCIALLY CANNED SEA FOODS as determined in NCA-CMI Nutrition Program

Product	Average Vitamin content in Mg. per 100 g. Vitamin A	Thiamin hydrochloride	Niacin	Riboflavin
Mackerel	.029	.034	7.82	.20
Salmon, red	.087	.021*	7.81*	.16*
Salmon, pink	.019	....	....	....
Sardines, in oil	.069	.024	4.71	.14
Sardines, in tomato sauce	....	.010	4.78	.22
Shrimp, dry pack	.017	.009	2.23	.032
Shrimp, wet pack	.018	.008	1.36	.031
Tuna	.008	.037	10.2	.14

* All species.

TABLE III—VITAMIN VALUES OF SOME COMMERCIALLY CANNED FRUITS AND VEGETABLES as determined in NCA-CMI nutrition program

	Average Vitamin Content in Mg. per 100 g. Ascorbic acid	Carotene	Thiamin	Niacin	Riboflavin
Apricots, halves	3.9	1.29	0.018	0.35	0.022
Asparagus, white	15.0	0.03	0.050	0.71	0.057
Asparagus, green	15.3	0.31	0.064	0.82	0.094
Beans, baked with tomato sauce	2.8	0.03	0.034	0.51	0.042
Beans, green, cut	3.3	0.18	0.029	0.32	0.035
Beans, lima green	7.2	0.08	0.032	0.54	0.040
Beets	3.0	0.007	0.008	0.14	0.024
Blackberries	8.2	0.11	0.013	0.21	0.019
Blueberries	13.3	0.024	0.014	0.19	0.014
Carrots	2.0	7.34	0.021	0.35	0.021
Cherries, red, pitted	5.9	0.52	0.027	0.19	0.016
Corn, white, cream style	5.5	0.012	0.027	1.08	0.049
Corn, yellow, cream style	5.6	0.08	0.030	0.94	0.052
Corn, white, whole kernel	4.7	0.02	0.021	0.93	0.044
Corn, yellow, whole kernel	4.5	0.09	0.026	0.83	0.045
Grapefruit juice	32.1	0.007	0.028	0.17	0.017
Grapefruit, segments	24.8	0.007	0.029	0.21	0.020
Kraut	17.6	0.031	0.034	0.11	0.041
Mushrooms	1.7	0.006	0.016	1.6	0.190
Orange juice	34.3	0.10	0.073	0.24	0.020
Peaches, halves, clingstone	3.8	0.26	0.007	0.60	0.021
Peaches, halves, freestone	2.5	0.20	0.008	0.55	0.020
Pears, halves	1.5	0.006	0.009	0.14	0.018
Peas, Alaska	9.7	0.29	0.092	0.87	0.054
Peas, sweet	9.2	0.26	0.112	1.00	0.057
Peppers, red, sweet	119.0	1.99	0.039	0.70	0.081
Pimientos	113.0	1.38	0.025	0.38	0.065
Pineapple juice	8.0	0.03	0.052	0.18	0.018
Pineapple, sliced	5.1	0.03	0.070	0.17	0.021
Potatoes, sweet	16.2	5.94	0.053	0.49	0.043
Prunes, Italian	1.6	0.72	0.023	0.36	0.020
Spinach	13.1	3.29	0.019	0.32	0.095
Tomatoes	17.0	0.58	0.052	0.69	0.027
Tomato juice	14.2	0.51	0.053	0.78	0.028
Turnip greens	19.5	2.64	0.015	0.58	0.090

Dissolved Nutrients

Much attention was paid in the course of the research to the nutrient values of the liquid part of the can contents. The findings have been widely publicized, to the end of further acquainting the consumer with the essential elements found in the liquid content. Data published include (Table VI) the distribution of three vitamins between solid and liquid in the case of common canned vegetables, which show that one-third of the vitamin values are in the liquid. There is a similar situation in the case of the mineral content (Table VII).

A final tabulation (Table VIII) shows the gain in available vitamins when the liquids from five canned vegetables are concentrated and saved.

Liquid Contents High in Minerals and Other Essentials

TABLE IV—CLASSIFICATION OF COMMERCIALLY CANNED FOODS according to content of proximate food components

PROTEIN

Products	Percent
Shrimp, dry pack; Tuna	27.0
Salmon; Sardines in oil; Mackerel	21.0
Sardines in tomato sauce	18.0
Shrimp, wet pack	15.0
Beans, baked	6.0
Beans, Lima; Peas	4.0
Mushrooms	3.0
Corn, vacuum pack; Corn, cream style; Spinach	2.5
Corn, W. K.; Asparagus, green; Sweet potatoes; Turnip greens	2.0
Beans, greens; Tomatoes; Tomato juice; Pimientos; Peppers; Orange juice; Sauerkraut; Cherries; Beets; Blackberries; Carrots; Apricots; Blueberries; Grapefruit; Grapefruit juice; Peaches; Prunes; Pears, Pineapple juice; Pineapple segments	1 or less

CARBOHYDRATE

Products	Percent
Sweet potatoes; Pineapple slices; Peaches, freestone	25.0
Apricots; Corn, yellow, cream style; Peaches, cling; Prunes; Blackberries	22.0
Beans, baked; Corn, white, cream style; Corn, whole kernel; Grapefruit segments; Pears	19.0
Corn, white, whole kernel; Pineapple juice	14.0
Beans, Lima; Blueberries; Cherries; Grapefruit juice; Orange juice; Peas, Alaska	12.0
Beets; Peas, sweet; Peppers; Carrots	9.0
Asparagus, white; Beans, green; Sauerkraut; Pimientos; Tomatoes; Tomato juice	4.0
Asparagus, green; Mushrooms; Sardines in tomato sauce; Spinach; Turnip greens; Mackerel; Salmon; Sardines in oil; Shrimp; Tuna	2 or less

FAT

Products	Percent
Sardines; Tuna	20.0
Mackerel	12.0
Salmon	7.0
Beans, baked; Shrimp, dry pack	2.0
Shrimp, wet pack; Corn, all styles; Peas, sweet; Peppers; Pimientos; Spinach; Apricots; Asparagus; Beans, green; Beans, Lima; Blackberries; Blueberries; Carrots; Cherries; Grapefruit juice and segments; Sauerkraut; Mushrooms; Orange juice; Peaches; Peas, Alaska; Pineapple; Pineapple juice; Prunes; Tomatoes; Tomato juice; Turnip greens; Beets; Pears; Sweet potatoes	1 or less

TABLE V—CLASSIFICATION OF COMMERCIALLY CANNED FOODS according to content of essential minerals

CALCIUM

Products	Approximate Mg. per 100g.
Sardines	350.0
Mackerel; Salmon	200.0
Shrimp, dry pack; Spinach; Turnip greens	100.0
Beans, baked; Shrimp, wet pack	50.0
Beans, green; Beans, Lima; Carrots; Sauerkraut; Pineapple slices; Sweet potatoes	40.0
Asparagus; Beets; Blackberries; Grapefruit segments; Peas; Pineapple juice	20.0
Apricots; Blueberries; Cherries; Grapefruit juice; Orange juice; Tomato juice; Peppers; Prunes; Tuna	10.0
Corn, W. K.; Corn, Y., cream style; Mushrooms; Peaches; Pears; Pimientos; Tomatoes	6.0
Corn, W., cream style; Cling peaches	4 or less

PHOSPHORUS

Products	Approximate Mg. per 100 g.
Sardines in oil	400.0
Salmon; Mackerel	300.0
Shrimp, dry pack, Tuna	225.0
Sardines in tomato sauce; Shrimp, wet pack	175.0
Beans, baked	100.0
Beans, Lima; Corn, C. S.; Corn, V. P.; Corn, Y., W. K.; Mushrooms; Peas; Sweet potatoes	65.0
Corn, W., W. K.; Asparagus, green	45.0
Asparagus, white; Beans, green; Beets; Carrots; Peppers; Spinach; Tomatoes; Turnip greens	30.0
Apricots; Blackberries; Grapefruit segments; Sauerkraut; Orange juice; Pimientos; Tomato juice	20.0
Cherries; Grapefruit juice; Peaches; Pineapple juice; Prunes	13.0
Blueberries; Pears; Pineapple slices	10 or less

IRON

Products	Approximate Mg. per 100 g.
Blueberries; Sauerkraut; Sardines in tomato sauce; Turnip greens	6.0
Asparagus, green; Beans, baked; Beans, Lima; Beets; Cherries; Blackberries; Sardines in oil; Shrimp; Spinach	3.0
Apricots; Asparagus, white; Beans, green; Mackerel; Peas; Peppers; Pimientos; Pineapple slices; Prunes; Tomato juice; Tuna	1.5
Carrots; Corn; Grapefruit juice; Grapefruit segments; Mushrooms; Orange juice; Peaches; Pears; Pineapple juice; Sweet Potatoes; Salmon; Tomatoes	0.7 or less

TABLE VI—DISTRIBUTION OF WATER SOLUBLE VITAMINS in consumer size cans of common vegetables

Vegetable	Can Portion	Weight Total per can (g.)	Distribution percent	Ascorbic Acid Concentration Mg./100 g.	Ascorbic Acid Distribution percent	Thiamin Concentration Mg./100 g.	Thiamin Distribution percent	Riboflavin Concentration Mg./100 g.	Riboflavin Distribution percent
Asparagus, green	Solid	359	62	17.6	60	0.065	62	0.124	71
	Liquid	222	38	19.2	40	0.065	38	0.081	29
Beans, green, cut	Solid	375	64	5.41	64	0.036	67	0.054	76
	Liquid	212	36	5.54	36	0.032	33	0.030	24
Beans, Lima, green	Solid	411	70	5.91	56	0.028	68	0.054	76
	Liquid	178	30	10.3	44	0.030	32	0.039	24
Carrots	Solid	378	64	2.55	66	0.022	66	0.021	74
	Liquid	216	36	1.97	34	0.020	34	0.013	26
Corn, white, whole kernel	Solid	392	67	3.86	48	0.015	67	0.031	80
	Liquid	191	33	8.54	52	0.015	33	0.026	20
Peas, sweet	Solid	393	66	9.30	63	0.120	66	0.065	70
	Liquid	203	34	10.6	37	0.121	34	0.054	30
Spinach	Solid	495	63	5.93	62	0.013	69	0.080	76
	Liquid	296	37	6.15	38	0.014	31	0.042	24
Corn, yellow, whole kernel	Solid	405	68	5.19	61	0.034	67	0.063	78
	Liquid	186	32	7.18	39	0.035	33	0.036	22

TABLE VII—MINERAL CONSTITUENTS OF SOLID AND LIQUID PORTIONS of some canned vegetables

	Calcium		Phosphorus		Iron		Proportions in can	
	Solid percent	Liquid percent	Solid percent	Liquid percent	Solid ppm.	Liquid ppm.	Solid percent	Liquid percent
Asparagus	0.021	0.017	0.042	0.019	11	8	66.02	33.98
Beans, green	0.036	0.012	0.023	0.013	17	10	61.34	38.66
Beans, Lima	0.029	0.023	0.077	0.066	17	16	67.73	32.27
Beets	0.021	0.005	0.031	0.026	7	4	65.30	34.70
Carrots	0.026	0.012	0.026	0.018	6	7	69.49	30.51
Corn, whole grain	0.005	0.003	0.052	0.048	6	4	68.29	31.71
Peas	0.032	0.012	0.077	0.048	21	14	63.88	36.12
Spinach	0.124	0.002	0.033	0.032	20	7	71.62	28.38

TABLE VIII—ASCORBIC ACID, THIAMIN AND RIBOFLAVIN in two methods of canned food preparation

Product	Method*	Retention of Vitamins in Percentage of Initial Content: Ascorbic acid percent	Thiamin percent	Riboflavin percent
Beans, cut green	A	75	100	105
	B	49	59	62
Beans, Lima, green	A	60	94	92
	B	37	65	74
Carrots	A	44	100	104
	B	..	...	...
Corn, yellow, whole kernel	A	49	93	98
	B	33	66	65
Peas, sweet	A	46	93	103
	B	39	63	67

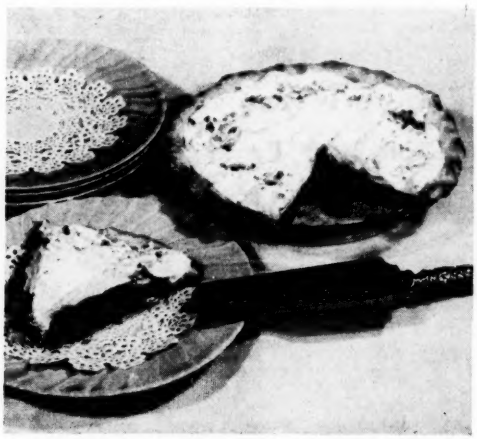
* Method A—Liquid concentrated.
Method B—Liquid discarded

Versatile mixer makes quick puddings . . .

TO PREPARE pudding, dry mix is dissolved in boiling water. Upon cooling in refrigerator, it forms a soft jelly. This is only one of many ways of serving "instant" mixes containing comminuted dehydrated fruits or vegetables.

. . . Or appetizing molded salads . . .

SAME PUDDING may be chilled in a mold, then removed and used in conjunction with fresh fruits to make a salad.



. . . Or fine fillings for pies

THIS prune pie features a filling made from a dry mix containing finely ground prunes, sugar, and a jelling agent.

New "Instant" Mixes Contain Dehydrated Fruits

Made with comminuted dried fruits or vegetables, they are quickly converted into puddings, pie fillings or salads, and may be packaged like gelatin desserts

DONALD K. TRESSLER
Consultant, Westport, Conn.

During the past five years, a means of putting dehydrated fruits in a class with modern, ready prepared or "instant" foods has been developed in the Tressler Laboratories, Westport, Conn.

The method consists of comminuting the dried fruits to a powder, preferably one which will pass a 40-mesh sieve, then adding sufficient sugar to sweeten, and a food ingredient which will cause the fruit and sugar to form a soft jelly when mixed with a specified amount of water.

Hammer Mill Used

The machine best suited for comminuting the dehydrated fruits is a hammer mill constructed of stainless steel and designed to operate at high speed. Since the powdered fruit is hygroscopic, the operation must be carried out in an air conditioned room.

Any one of four jelling agents may be used: Gelatin, corn starch, Irish moss, or low methoxyl pectin. The choice of jelling agent depends upon the particular fruit used.

The resulting powder or "mix" can be marketed in packages of the type used for gelatin desserts. It is prepared for the table by adding water and immediately heating to a boil—a process similar to the one used in making gelatin and corn starch desserts. When cool, the mix sets to a jell. It can be eaten either as a pudding or as a molded salad.

Pies and Salads

If the warm product is poured into a previously baked pie shell and then cooled, a delicious pie is obtained. The prune, apricot, banana, lemon, pumpkin, squash and sweet potato pies are especially fine. Apricot pies made from the prepared mix not only have a delicious flavor but also a beautiful color. Moreover, the cost should be far less than that of pies made from fresh or canned fruits.

In the case of dehydrated tomato, sugar is omitted from the mix. The product obtained, when the mix is heated with water and cooled, is an aspic which is especially useful in making salads.

It should be noted that the pudding and pie-filling mixes described above are complete, requiring only the addition of water in their preparation. The cost of the ingredients used is small. It should be possible to sell the mixes at such a low price that the cost of each serving would be less than that of a chocolate corn starch pudding.

Since these preparations are made with the real fruits containing natural minerals and vitamins, the resulting puddings and pies are considerably more nutritious than the products of many other dessert powders, some of which contain imitation fruit flavors. Prunes, for example, are rich in iron, riboflavin and niacin. In addition they have a valuable laxative effect. Apricots are a good source of iron and of carotene, the precursor of vitamin A.

Ice Cream Mixes

If a stabilizer is used in the mix instead of a jelling agent, a fruit ice cream type of mix is obtained. When water is used in the preparation of the mix to be frozen, an ice will be obtained. If milk is used, a sherbert results, and, of course, cream must be used when ice cream is desired.

The ice-, sherbert-, or ice cream mix can be frozen in an ordinary ice cream freezer; or, if desired, the mix can be frozen in an ice cube tray of a refrigerator.

When making one of these products in a refrigerator, the procedure should be as follows:

The package of mix is emptied into a bowl. Water, milk or cream is added, and then the mixture is stirred until the powder is in suspension—usually about ½ min. The suspension is then poured into an ice cube tray, which is immediately placed in the freezing compartment of the refrigerator. The empty bowl is put in the food compartment to become chilled.

When the mixture is about half frozen (approximately 30 min.), it is returned to the chilled bowl, and whipped until the volume nearly doubles. Then it is placed in the cube tray and put back into the freezing compartment. In 2 to 3 hours the mixture will be ready to serve.

These mixes should enable the housewife to make a fruit ice, sherbet, or ice cream at a minimum cost. Furthermore, their use should make available many novel frozen desserts.

Any fruit that can be satisfactorily dried or dehydrated can be used in making these products. Some of the most desirable fruits are: Apples, apricots, bananas, blueberries, cherries, cranberries, currants, dates, figs, grapes, lemons, oranges, plums, prunes, pineapples, raisins, black, purple or red raspberries. Pumpkins, squash and sweet potatoes are especially good for pie fillings, and tomatoes can be used for aspics.

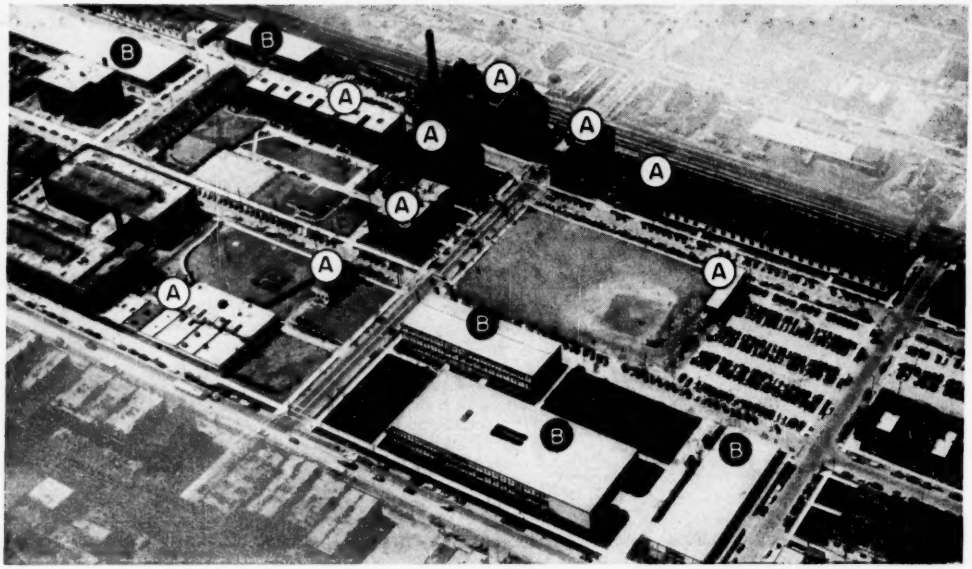
Toward Greater Utilization of Dried Fruits

The truth is that many possibilities for using dried and dehydrated fruits, and also vegetables, in ready-to-use desserts and other complete food mixes have been almost wholly overlooked. And some of these possibilities may point the way to greatly increased use of these products and the reduction of surpluses that have been a headache to growers and the Federal Government alike.

Such additional domestic use, however, depends to a large extent upon more careful processing and storage instead of the present practice of drying and storing outdoors for months before packaging. Drying to higher moisture content, then holding under refrigeration, has been shown to yield products of superior color, texture and flavor.

In addition to the uses suggested in the above article, the author and other investigators have successfully made prepared cereals of the granular and flake types containing large amounts of dried fruits. Dried apples have been especially well adapted to this process.

Other possible outlets for dried fruits are in fruit bars, cookies, cakes and breads. Suggested for this use are raisins, fig paste, and the like.—*Editors*



Institute's comprehensive building-modernization program is facilitating the food-study developments. Airview indicates progress. Buildings (A) are to be replaced to match new structures (B), which were added at cost of $5,000,000.

Illinois Tech Combines Engineering With Food Technology

Part I—Expanded, integrated curriculum provides for industrial cooperation and for granting bachelor and graduate degrees in food technology

M. E. PARKER

Director of Food Technology Program,
Illinois Institute of Technology, Chicago

On developing its curriculum for its undergraduate course in Food Technology, Illinois Institute of Technology has given careful consideration to the trends in industry, and to the apparent industrial requirements for those individuals seeking careers as food engineers and technologists.

It recognized, for example, that the food industries accepted food chemists and food bacteriologists as technically trained personnel 20 to 30 years ago, when formal training in food technology was not available.

Many of these early-day students upon entering industry found that their training had been inadequate. The need for some engineering background soon became apparent to them as well as to their employers. The result has been that, during more recent years, the food industries have been employing chemical engineers. Many of these individuals also have been at a disadvantage. They lacked training in the biological sciences that are of fundamental importance to food processing technics and developments.

At Illinois Institute of Technology, the demand for food engineers and technologists is being met by offering its course in Food Engineering & Technology with major sequence in chemical engineering supported by basic training in the sciences of biology, chemistry and physics. A review of the synopsis of its 4-year undergraduate curriculum leading to the degree of Bachelor of Science in Food Engineering and Technology is outlined in Table I.

This curriculum is designed to train individuals for either production, management, or research development careers. Upon completion of the sophomore year, the student chooses the essential courses of study by selecting appropriate technical elective subjects to be studied during his junior and senior years. For those interested in production, emphasis is placed upon basic engineering subjects; in management, upon business and engineering economics; and in research, upon biological sciences and food technology.

The selection of technical electives, as well as those of liberal studies and humanities, is provided to give the student a well balanced education without neglect of the basic sciences and engineering subjects essential to the technological training of food engineers.

Irrespective of the student's selection of technical electives, he will find it possible either to assume a responsible position in the food industry upon completing his undergraduate training or to advance his professional career by appropriate graduate studies leading to the award of the degree of Master of Science in Food Engineering & Technology or of Doctor of Philosophy.

Food Plant Experience

Because of Chicago's central location in the food-producing Midwest as well as the multitude of food industries located in its greater metropolitan area, Illinois Institute of Technology has developed a cooperative plan

Tables Show How Course Integrates Study and Practice

TABLE I—Curriculum for Under-Graduate Course in Food Engineering and Technology

Synopsis of Curriculum

First Semester	Credit Hours		
Engl. 101 Fundamentals of English	3	0	3
Chem. 111 General Chemistry	4	4	5
Math. 101 College Algebra & Trigonometry	5	0	5
Bi. 110 Zoology	2	6	4
T. D. 101 Technical Drawing	1	5	2
Phys. Education	2	0	0
Totals	17	15	19

Second Semester	Credit Hours		
Engl. 102 English Composition	3	0	3
Chem. 112 General Chemistry	4	4	5
Math. 102 Analytical Geometry & Trigonometry	5	0	5
Bi. 113 Botany	2	6	4
T. D. 102 Technical Drawing	1	5	2
Phys. Education	2	0	0
Totals	17	15	19

Third Semester			
Chem. 231 Organic Chemistry	3	6	5
Chem. 223 Quantitative Analysis	2	8	5
Chem. 221 Theoretical Chemistry	1	0	1
Math. 201 Calculus	4	0	4
Phys. 201 General Physics	4	0	3
Phys. 205 Physics Laboratory	0	3	2
Totals	14	17	20

Fourth Semester			
Chem. 234 Organic Chemistry	3	0	3
Ch. E. 205 Stoichiometry	2	4	4
Math. 202 Calculus	4	0	4
Mech. 203 Applied Mechanics	2	2	3
Phys. 202 General Physics	4	0	3
Phys. 206 Physics Laboratory	0	3	2
Totals	15	9	19

Fifth Semester			
Bi. 421 Bacteriology	2	6	4
Chem. 341 Physical Chemistry	3	6	5
Ch. E. 101 Unit Operations	2	4	4
B. E. 101 Economics	3	0	3
Technical Elective*	3	0	3
Totals	13	16	19

Sixth Semester			
Chem. 342 Physical Chemistry	3	6	5
Ch. E. 312 Unit Operations	4	0	4
Ch. E. 321 Chem. Eng. Laboratory	0	3	1
B. E. 102 Economics	3	0	3
Technical Elective*	3	0	3
Humanities Elective	3	0	3
Totals	16	9	19

Seventh Semester			
B. E. 348 Economics of Food Production	3	0	3
Bi. 440 Biochemistry	2	6	4
Ch. E. 424 Chem. Eng. Lab.	1	4	2
F.E.T. 401 Food Technology	2	6	4
Technical Elective*	3	0	3
Liberal Studies Elective	3	0	3
Totals	14	16	19

Eight Semester			
Bi 422 Food & Industrial Bacteriology	2	6	4
F.E.T. 402 Food Engineering	2	6	4
P. S. 420 American Government	3	0	3
Engl. 409 Public Speaking	2	0	1
Technical Elective*	3	0	3
Liberal Studies Elective	3	0	3
Totals	15	12	18

*For students electing the following options, the corresponding technical electives are recommended:

Management
- 5th semester—B.E. 120 Principles of Accounting
- 6th semester—B.E. 363 Personnel Management
- 7th semester—B.E. 351 Theory of Organization and Management
- 8th semester—B.E. 427 Engineering Economics

Production
- 5th semester—E.E. 414 Electricity
- 6th semester—E.E. 415 Electricity
- 7th semester—Ch. E. 451 Chemical Engineering Thermodynamics
- 8th semester—M.E. 424 Mechanical Engineering Thermodynamics

Research
- 5th semester—F.E.T. 406 Food Analysis & Instrumentation
- 6th semester—Bi. 424 Sanitary Microbiology
- 7th semester—Bi. 431 Identification of Microorganisms, or H.E. 310 Nutrition and Food Processing
- 8th semester—Bi. 463 Bacteriological Physiology & Chemistry, or F.E.T. 405 Special Problems, or F.E.T. 491 Food Engineering & Technology Research Projects.

TABLE II—Curriculum for Co-operative Course A

Illinois Institute of Technology and (Co-operating Company)
Complete Schedule of Training for Students Entering Program in September

Fall Semester	Winter Semester	Summer Session	School Closed
3rd week of Sept.— **4th week of Jan.** **Total: 19 weeks**	**3rd week of Feb.—** **2nd week of June** **Total: 17 weeks**	**4th week of June—** **3rd week of Aug.** **Total: 9 weeks**	**4th week of Aug.—** **2nd week of Sept.** **Total: 4 weeks**
1948–49	**1949**	**1949**	**1949**
Biology 110 4	Work	Biology 113 4	Work
Chemistry 111 5		Mathematics 102 5	
Tech. Drawing 101 2		9	
English 101 3			
Mathematics 101 5			
19			
1949–50	**1950**	**1950**	**1950**
Work	Tech. Drawing 102 2	Work	Work
	English 102 3		
	Chemistry 112 5		
	Mathematics 201 4		
	Physics 201 3		
	Physics 205 2		
	19		
1950–51	**1951**	**1951**	**1951**
Chemistry 231 5	Work	Chemical Eng. 205 4	Work
Chemistry 223 5		Biology 421 4	
Chemistry 221 1		Economics 101 3	
Mathematics 202 4		11	
Physics 202 3			
Physics 206 2			
20			
1951–52	**1952**	**1952**	**1952**
Work	Biology 422 4	Work	Work
	Economics 102 3		
	Chemistry 234 3		
	Mechanics 203 3		
	Liberal Studies 6		
	19		
1952–53	**1953**	**1953***	**1953***
Biology 440 4	Work	Chem. Eng. 312 4	Work
Chem. Eng. 311 4		Food Eng. 402 4	
Chemistry 341 5		Public Speaking 1	
Food Tech. 401 4		9	
Food Production 348 3			
20			

* To be completed in day or evening classes:

American Government 420 ...	3	Humanities Elective	3
Chemistry 342	5	Technical Electives	9
Chemical Engineering 321 ...	1		18

TABLE III—Curriculum for Co-operative Course B

Illinois Institute of Technology and (Co-operating Company)
Complete Schedule of Training for Students Entering Program in February

Winter Semester		Summer Session		School Closed		Fall Semester	
3rd week of Feb.— 2nd week of June Total: 17 weeks		4th week of June— 3rd week of August. Total: 9 weeks		4th week of Aug.— 2nd week of Sept. Total: 4 weeks		3rd week of Sept.— 4th week of Jan. Total: 19 weeks	
1949		**1949**		**1949**		**1949–50**	
Biology 113	4	Work		Work		Biology 110	4
Chemistry 111	5					Chemistry 112	5
Tech. Drawing 101	2					Tech. Drawing 102	2
English 101	3					English 102	3
Mathematics 101	5					Mathematics 102	5
	19						19
1950		**1950**		**1950**		**1950–51**	
Work		Mathematics 201	4	Work		Work	
		Physics 201	3				
		Physics 205	2				
			9				
1951		**1951**		**1951**		**1951–52**	
Chemistry 231	5	Work		Work		Economics 101	3
Chemistry 223	5					Food Technology 401	4
Chemistry 221	1					Chem. Eng. 205	4
Biology 421	4					Chemistry 234	3
Mathematics 202	4					Physics 202	3
						Physics 206	2
	19						19
1952		**1952**		**1952**		**1952–53**	
Work		Economics 101	3	Work		Work	
		Biology 440	4				
		Mechanics 203	3				
			10				
1953		**1953**		**1953**		**1953–54***	
Food Engineering	4	Work		Work		Public Speaking	1
Chem. Eng. 311	4					Chem. Eng. 312	4
Chemistry 341	4					Chem. Eng. 321	1
Biology 422	4					Chemistry 342	5
Food Production 348	3					Technical Elective	3
						Liberal studies	6
	19						20
* To be completed in day or evening classes:				Liberal Studies Elective	3	American Government	3
				Technical Elective	3		
							9

with selected food-processing companies whereby the student alternates periods of study and work. Under such a plan the student not only earns money to finance his education. He also acquires experience that will enable him better to understand and appreciate his studies. It has the additional practical value of making for better students, who stimulate the best efforts of the instructional staff and prepare the student to enter industry upon graduation without the necessity of serving a probationary period for adjusting himself to the industrial requirements.

This advantage is recognized by industry as evidenced by the ready support Illinois Institute of Technology is receiving from those companies aiding in conducting its cooperative plan of training. As a matter of fact, Illinois Tech is fully cognizant of the challenge and opportunities such cooperation makes possible.

In order that the reader might better visualize the mechanics of conducting the cooperative plan, we present in Tables II and III—the Cooperative Students' Plan—wherein the courses of study pursued at Illinois Tech are outlined in detail. The cooperating company itself completes the plan by designating those departments and divisions wherein the student will gain his experience.

For these "Work" periods he is given an academic credit for "8 hours" while gainfully employed. Table II outlines the program of the student, who starts at the Institute with the beginning of the fall semester in 1948, while Table III outlines the program of the student who starts at work in the co-operating company's plant with the beginning of the fall semester in 1948 and begins his study program with the beginning of the winter semester in 1949 at Illinois Tech.

In establishing a Cooperative Students' Program with a cooperating company, Illinois Institute of Technology requires the presentation of a completed synopsis of curriculum with definite assignments of the student's time for gaining experience in the various departments and divisions of the cooperating company. Development and establishment of a detailed plan of compensation and other details of employment are also requested. The compensation is based upon increasing rates for subsequent periods of work as the student acquires experience and training.

To facilitate the reader's understanding of some of the details involved, Part II of this article will present the Cooperative Student's Program in Food Engineering & Technology de-

(*Turn to page* 188)

Food Technology Council

F. C. Buzzelle, Director of Products Control, General Mills, Inc.
Berton S. Clark, Director of Research, American Can Co.
George A. Crapple, Director of Research, Wilson & Co.
Victor Conquest, Director of Research, Armour & Company
A. L. Elder, Director of Research, Corn Products Refining Co.
George F. Garnatz, Director, Kroger Food Foundation
Philip P. Gott, President, National Confectioners' Assn. of U. S.
Charles E. Gross, Director of Scientific Research, John Morrell & Co.
Lloyd A. Hall, Technical Director, Griffith Laboratories, Inc.
Lee Hickox, Vice-President, Container Laboratories, Inc.
Rohland A. Isker, Secretary, Associates, Food & Container Institute
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J. T. Knowles, Vice-President, Libby, McNeill & Libby
Norman H. Kraft, Vice-President, Kraft Foods Co.
Henry R. Kraybill, Director of Research & Education, American Meat Institute Foundation
F. H. Kullman, Vice-President, Bowman Dairy Co.
A. L. Malone, Gen. Mgr. of Research Continental Can Co.
Paul D. V. Manning, Vice-President, International Minerals & Chemical Corp.
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J. G. Shakman, Vice-President, Pabst Brewing Co.
Fred P. Siebel, Jr. President, J. E. Siebel Sons' Co.
E. S. Stateler, Associate Editor, Food Industries
Robert I. Tenney, President, Wahl-Henius Institute

Grit in this cheese . . .

. . . Resembles glass because—

Calcium Tartrate Crystals Can Form in Processed Cheese

Analysis of the grit proved it was calcium tartrate crystals formed by reaction of added tartrates with calcium in the cheese

J. F. Blanchard
Superintendent of Laboratory
Food & Drug Office
Department of National Health & Welfare
Winnipeg, Manitoba, Canada

Food & Drug officials occasionally receive complaints that food contains broken glass. In many cases, this so-called "broken glass" proves to be merely insoluble-salt crystals, which have formed in the food after processing.

Recently, a sample of processed cheese containing gritty material was sent to this office for examination. The grit was found to be crystals of calcium tartrate.

Other Crystals

Although crystals such as those of magnesium ammonium phosphate in canned salmon and of tartrate in grape juice are of common occurrence, it appears from a search of the literature that calcium tartrate crystals in processed cheese have not heretofore been reported.

Where tartrates are used in cheese processing, it is indicated that, under favorable conditions, they react with the calcium present to form these crystals.

Discovery of what favorable conditions are, and how to avoid them, would make an interesting study and would be invaluable to cheese processors who encounter this difficulty in their operations.

Separation of Crystals

Crystals were separated and identified as follows:

The simplest method for isolating the crystals was by picking them out of very thin slices of the sample. Separated in this way, the crystals appear to be clean and free from contamination (see photos above). If thought advisable, they can then be washed with dilute ammonia solution and air dried.

Dissolving the curd in dilute ammonia solution (1 to 9) was also tried. But while this was less tedious than picking, it was difficult to get rid of the adhering curd completely. The addition of papain after most of the curd has been dissolved with ammonia and poured off, helped to free the crystals from adhering curd. They were then washed with alcohol and ether. The crystals thus obtained appeared to be reasonably free from contamination.

Color Tests

A few of the crystals were heated over a Bunsen burner and, when it was found that carbonization took place, a further amount was burned, giving an ash content of 21.6 percent. Estimation of the ash by precipitation with oxalate indicated that this was calcium oxide and, by calculating the molecular weight on the basis of 21.6 percent calcium oxide, a figure was obtained approximating that of calcium tartrate.

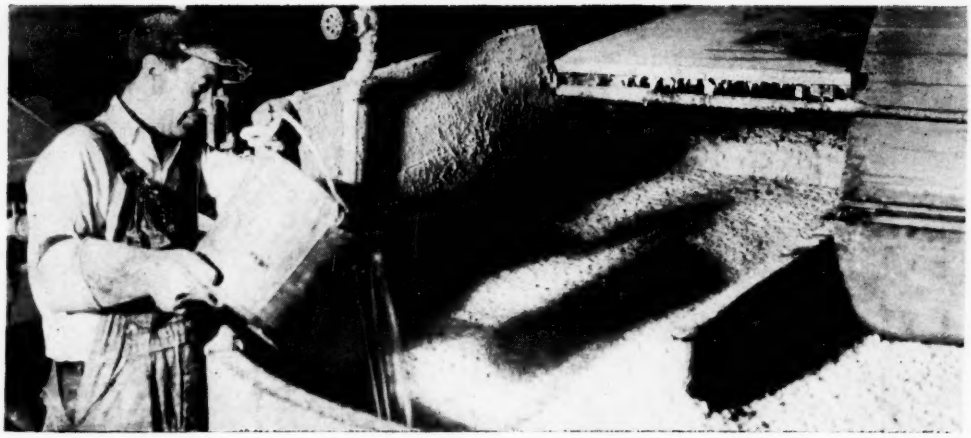
Tartrate was confirmed by dissolving a few crystals in sulphuric acid and adding a small amount of resorcinol and warming. Presence was indicated when a pink color developed in the solution.

Furth-Herrmann Test

More confirmation was obtained by the Furth-Herrmann test. In this test it was necessary to precipitate the calcium as the oxalate. The filtrate was evaporated to dryness and then dissolved in pyridine and the acetic anhydride added. This gave a yellow green rather than the emerald green described in the test, probably due to the oxalate present. When calcium tartrate was tested in the same way, it gives a yellow green colored solution similar to the one obtained when the sample of unknown crystals was tested.

Acknowledgment

The author wishes to thank Mr. H. A. Watson, Regional Director of this office, for advice, and Dr. C. A. Morrell, Director of the Food & Drug Division, Ottawa, for permission to publish this note.



When paper pulp gets this simple treatment, result is . . .

Wet-Strength Papers Find New Applications In Packaging Moist Food Products

Resin-impregnated materials are solving problems for processors of frozen foods, dairy products and beverages. And they are inexpensive to make

ROBERT P. GOODALE
Rohm & Haas Co., The Resinous Products Division, Philadelphia

Lack of strength of wrapping papers when they became wet was one of the principal drawbacks limiting their use for packaging moist foods—until high wet-strength papers were developed (p. 102, May 1947 FOOD INDUSTRIES).

These new wet-strength papers are easy and inexpensive to make. All that is required is the addition of a small amount of urea-formaldehyde resin or melamine-formaldehyde resin to the paper pulp before the sheet is formed.

The amount of wet strength produced in a sheet of paper depends to a large extent upon the amount of resin added to the pulp. An optimum wet strength of the order of one-third of the normal dry strength (tensile strength and burst resistance) is easily produced by the use of about 3 percent resin on pulp solids. Since untreated paper has very little strength when wet, resin treatment can increase the wet strength of the paper as much as 800 percent. As for tear, the wet tear of treated paper is higher than the dry tear of the same untreated paper.

Papers made by using melamine-formaldehyde or urea-formaldehyde resins can be soaked in water for days or even weeks at room temperature, yet still remain strong and tough.

The use of urea-formaldehyde resins is the more recent development. But until lately these resins were applied to paper after sheet formation instead of being added to the pulp before the sheet is formed, as in the present practice. When using urea-formaldehyde resins, the trim from the paper rolls (known as "broke") can easily be repulped, if used promptly.

In their short history, these new wet-strength resins have greatly expanded the potential market for paper products. Since no real change in production is involved, the price of wet-strength papers is only slightly higher than that for untreated paper.

As time passes, increased use of the wet-strength papers is foreseen. To understand their usefulness, let us review some of the present applications of these resin-treated papers in the food industry.

New Frozen Food Wrapper

One of the most interesting of the new papers is a wet-strength glassine for wrapping frozen foods. This film will withstand the soggy atmosphere of a cold storage unit or moisture from frozen food—yet it will remain strong. Frozen peas, for example, have been stored for months, thawed out in the wrapper at room temperature, and then poured from the paper without danger of the wrapper tearing.

Anyone familiar with frozen foods packed in untreated paper knows how difficult it is to remove the wrapper, which sticks to the food. And as soon as the product is defrosted, the paper becomes wet, loses strength, and adheres tenaciously to the food. Usually, it is necessary to peel off the wrapper bit-by-bit. Wet-strength glassine, on the other hand, is tough, hence can be pulled off in one piece. This glassine is also cheaper than plastic films, and it will do a good job of protecting the food.

Wet-strength, greaseproof papers are also meeting with favor in the packaging of butter, cheese, and ice cream. Paper has long been used in these applications, but it was usually parchmentized, and sometimes waxed. Parchment paper, which possesses very high wet-strength properties, is more expensive than the newer wet-strength, greaseproof paper; while waxed paper is less effective.

Once the wax film on wax paper

. . . Water-safe bags, anti-sog meat wrappers, and non-sticking glassine

cracks, water can penetrate the base sheet, and then it will tear easily. The new wet-strength, greaseproof papers are only slightly more expensive than waxed papers. And some manufacturers are combining the waxing and wet-strength technic to produce a paper that will not only be moisture-vapor-proof, but will also be capable of holding together even if water should penetrate the surface.

Packaging Dairy Products

Another new use for greaseproof papers is in packaging chocolate-coated ice cream and frozen sherberts and ices, most of which are sold on sticks. For sanitary purposes, these foods are protected with covers, usually made of paper, and when stored in refrigerated units, bars and frozen sherberts often stick together, causing the merchandiser difficulties. The paper in its weakened condition usually falls apart under these circumstances, and covers are either badly torn or come off entirely.

Here, the answer is wet-strength paper, because of its great resistance to tearing when wet. If the bars do stick together they can be pulled apart without damage to the wrappers.

Frozen Food Locker Papers

Second cousins to wet-strength papers are the higher basis-weight locker papers for wrapping foods that are stored under refrigeration. It is an easy matter, for example, to wrap meat in locker paper and keep the package in cold storage for many months. Often, moisture from the meat gradually soaks into the paper. Then the wrapper tears and no longer protects the meat. But if wet-strength treatment has been given the wrapper stock, this will not happen.

Sometimes waxed papers are used with the intention of preventing water from penetrating the wrapper. But as stated earlier, the mere development of a small crack in the surface of the wax film will invite damage. Before long, water will enter at this point and the paper will become weak. And in all probability this paper will then tear the next time it must carry a heavy load.

Occasionally, the user may require only one portion of the meat that is wrapped in a bundle, and to get it he may take the package into a warm room. Then moisture will condense on the package and soak into the paper. And when the remaining meat is returned to the cold storage unit, the wrapper will freeze to it in a short time. Later on, removal of the paper from the meat will be difficult. But use of a wet-strength wrapper will obviate these troubles.

In warehouses where large amounts of packaged foods are stored for eventual resale, wet-strength wrapping papers are sometimes used to package a stock of smaller boxes. When these packages are removed from the cold storage warehouse and stacked on a loading platform or placed in a truck, moisture immediately condenses on them. Unless the paper has wet-strength properties, it will soon become worthless as a wrapping material.

Better Grocery Bags

Wet-strength papers are also receiving serious consideration for wide use in kraft grocery bags. Almost everyone has had the unpleasant experience of having a milk bottle break through the bottom of an ordinary grocery bag. This difficulty is caused by water condensing on the cold bottle and running onto the paper. Before long the bag suddenly gives way. Wet-strength grocery bags are also particularly suitable for holding wet fruits, vegetables, fish, meats, and frozen foods.

Wet-Rub Resistance Improved

The same treatment that improves the wet tensile, mullen (resistance to bursting), and tear strengths of paper also brings a remarkable improvement in the paper's wet-rub resistance—for wet-strength paper can be saturated with water and vigorously rubbed without damage. Hence, the treatment is being considered for various kinds of paperboards—particularly those used to package frozen foods and bottles of cold beverages. These boxes frequently come in contact with frost or water and must be able to withstand considerable abrasion without serious damage.

A possibility is that the waxing operation used in making ice cream boxes might be eliminated if the base stock were composed of wet-strength board.

For some time, bottled beverages have been packed in cardboard cartons which ordinarily hold six bottles. These cartons are strong enough as long as the bottles are not wet or cold, bringing moisture danger, and provided the customer does not carry them in the rain. But if there is any such soaking, the carton will lose its strength, and the bottles may drop on the pavement. To overcome this difficulty, wet-strength cartons are indicated.

Photos in this article courtesy Resinous Products & Chemical Co., and Thilmany Pulp & Paper Co.

UNLOADING is speeded by such equipment as derrick booms and traveling cranes, which drop loads onto roofless trailers.

Trucks Rush Fish Catch From Boats to Canneries

Fleet of 30 units transports fish and supplies between northwest coastal receiving stations, processing plants, and warehouses.

MOTOR trucks provide the vital transportation link between the fresh and frozen fish receiving and buying stations of the Columbia River Packers Assn. on the Oregon and Washington coasts, and the company's three canneries, in Astoria, Ore., and Bellingham and Aberdeen, Wash.

Trucks have not only made possible the most practical location of these receiving stations, but have also enabled the fishing fleets to increase their production by making the quickest possible turnarounds between the fishing grounds and the unloading points. At the same time the station-truck combination has permitted operation of the canneries in cities where the most economical processing of the fish can be carried out.

Two-Way Loads

Inbound from the receiving stations, the trucks haul fresh and frozen fish direct to the canneries. On their return to the receiving stations, they carry loads of miscellaneous equipment, such as empty shipping containers, fish boxes, live bait, water tanks, and supplies for the fishing vessels.

In addition, they are used to haul the company's canned fishery products from the canneries to warehouses. One of the company's tractor-trailers has a mechanically-refrigerated body capable of carrying loads of 28,300 lb. of frozen fish or crab meat at 15 deg. F. Most of the company's fresh fish is transported in ice in boxes containing approximately 200 lb. of fish each.

The company first used trucks in 1937 and today operates a fleet of 30. Of these, 27 are straight trucks, while three are tractor-trailer combinations. Most of the straight trucks are six-wheelers of the three-axle type, selected for their heavy load-carrying capacity and ability to maneuver within the confines of the small dock areas at many of the receiving stations.

By makes, the fleet consists of 22 Chevrolets, 4 Internationals, and 1 each of Ford, Plymouth, Dodge and G.M.C.

The round-trip hauls from the various receiving stations to the canneries vary from 30 to 510 miles. Even greater distances are covered by cannery-to-warehouse hauls. One such haul between the company's Astoria, Ore., cannery and its warehouse in Watsonville, Calif., is 843 miles one way.

One unusual thing about the truck fleet is that all of the truck bodies, except the one mechanically-refrigerated trailer, are of the open-top type, designed to accommodate the company's method of loading.

Because of lack of space at the fish-receiving docks and wharves, loading is not done across platforms but from electric mechanical hoists, which run along overhead rails, extending out to the boats to facilitate unloading.

Equipped for Speed

Rapid boat unloading is one of the operating "musts" of the company—since its fishermen are always in a hurry because they have to fish while the fish are there and the weather is good. There is no money made when the boats are idle at dock. This explains the use of the speedy, overhead-rail mechanical hoists, which load the

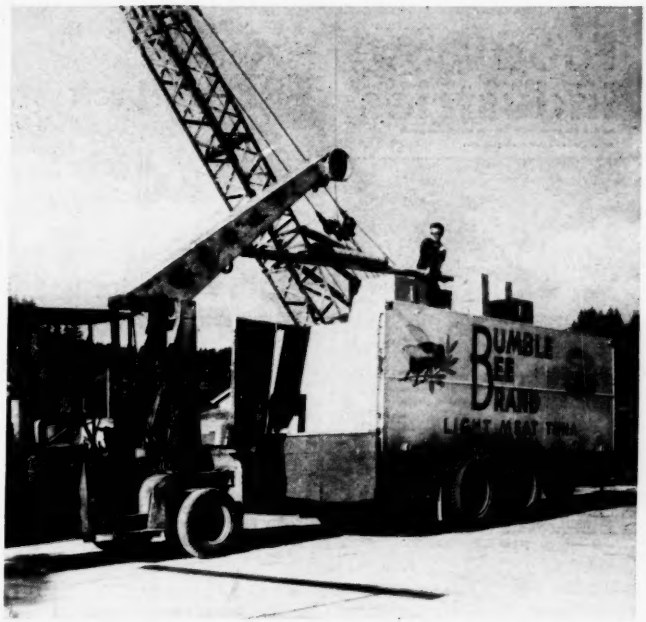
trucks via their open tops rather than into open ends. When the trucks cannot reach the overhead hoists, modern fork-lift, trucks are employed. At other times, trucks are loaded direct from shipside by use of the boat's derrick booms.

The company processes all kinds of river and ocean fish, including crabs and bottom fish. Salmon come from the Columbia River, and yellow fin tuna are caught off the coast of Costa Rica.

Cold Storage Reserve

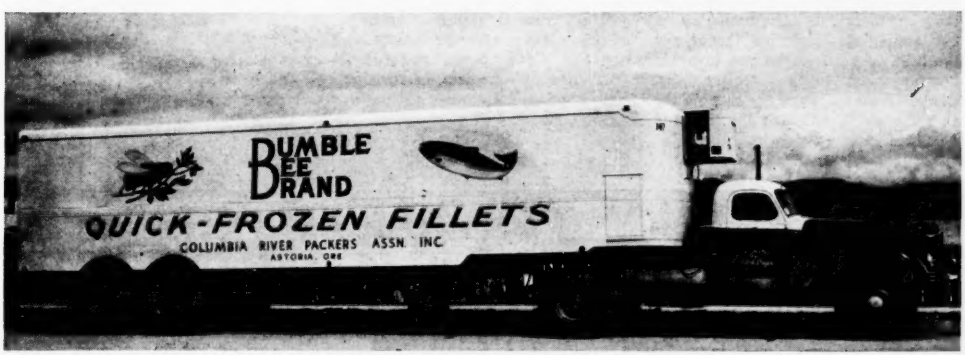
During peak periods at the cannery, some of these fish, including the yellow fin tunas, are hauled into co'd storage to be held until they can be processed. This provides not only a rapid turnaround schedule for the boats, but insures a ready flow of raw materials to the processing plant, thus preventing costly slowdowns that plague many plants.

A standardized color scheme is employed in the paint jobs done on all company trucks. Truck and tractor engine hoods are red; the cabs are red on the bottom and white on the top; the fenders are black; and the bodies are white, with the lettering in red and the fish signs painted in natural colors.

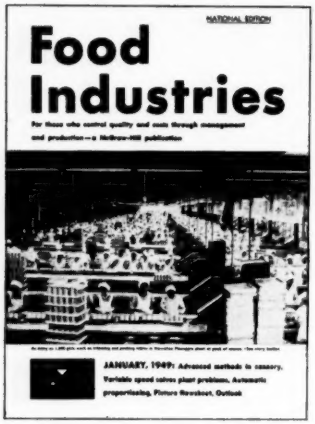


SUPPLIES—live bait tanks in this case—are carried to Columbia Packers' fishing boats on the return trips of the company's big road carriers.

MANEUVERABILITY in small dock areas and easy loading features are prime considerations in selecting trucks.



PRIDE of the fleet is this tandem-axle refrigerated trailer which keeps a 28,300-lb. payload at not over 15 deg. F.


NATIONAL EDITION
Food Industries
JANUARY, 1949: Advanced methods in canning. Variable speed valves plant problems. Automatic proportioning. Picture Review. Outlook

Your Magazine —Its New Look and New Program

What these mean in terms of greater service to you as a reader

M. A. WILLIAMSON
Publisher of Food Industries

AS a progress report on itself, FOOD INDUSTRIES takes this opportunity to mention and interpret the many editorial improvements recently introduced. As you read this report you will notice that the innovations do not deviate from the basic editorial formula followed for 20 years. Rather they implement that formula.

FAST-READING FORMAT—Your magazine has been restyled from cover to cover. The reasons are: (1) To increase readability. (2) To translate into editorial-page appearance that clean look of the modern food plant and food package.

We call your attention particularly to the new Contents Page, designed to help the reader. By means of a checklist arrangement, all editorial material is identified in respect to branches of the industry. At the same time, feature articles are classified functionally.

BROAD EDITORIAL COVERAGE—Material on many branches of the food processing industry will be carried in each issue. This enables the magazine effectively to perform its function of bringing to readers information about outstanding developments throughout the field. And it allows you to profit from progress in the industry as a whole. A second value comes from the fact that one branch of the industry necessarily competes with others for space in the consumer's stomach. So you need to know what the entire industry is doing. Thirdly, you personally can profit from a broad knowledge of the greater food field.

FOOD INDUSTRIES PRODUCTION INDEX —Introduced in September, the FI Index of processed food production will appear in each issue. A large chart shows the overall trend for the industry, and 14 smaller charts show trends in various branches. These charts will enable management better to judge what lies ahead and will facilitate future planning. The position of the overall Index will be flashed on the cover of each issue.

ADVANCED FOOD PLANT ENGINEERING—We started in August a series of articles on Advanced Food Plant Engineering. We shall continue this series as a means of bringing to the reader's attention the latest methods of cutting costs and improving quality. Thirteen articles of this type were published last year.

FOLD-OUT PICTURE-FLOWSHEETS—We introduce in this issue the large, fold-out picture-flowsheet, to be carried each month. To show modern processing methods and equipment, these flowsheets will be a part of our program on Advanced Food Plant Engineering. They are discussed in detail elsewhere in this issue.

SPECIAL REPORTS—An important part of our new editorial program is publication of special reports of three different types: (1) Round-up of recent progress in a particular branch of the industry, covering both technology and plant operations. (2) Report on a unit process, comprising a well-rounded treatment of the significant facts about the process. (3) Report on a unit operation, similar in treatment to the unit process report.

These special reports supplement our regular articles and departments to give complete coverage of all of the significant advances in the greater food processing field.

SERIES ON NUTRITION—In each issue since September, we have published an article on some aspect of the problem of increasing the nutritive value of processed foods. When complete, this series will be the equivalent of a special issue on the subject.

OUTLOOK ARTICLES—People in any business need to look ahead at the economic trends and interpret their significance. So a part of our program is to publish outlook articles, one of which appears in this issue.

FOOD INDUSTRIES AWARD—To carry one step further our policy of promoting progress in the food industries, we have established a biennial award. The second one will be presented this year at the San Francisco conference of the Institute of Food Technologists. It will go to the processor who, in the opinion of the Award Jury, has developed or adopted the most outstanding process since VE Day.

MANPOWER, TRAVEL, PAGES — To carry out the program outlined, we maintain a large editorial staff, including a Midwestern Editor, E. S. Stateler, and a Pacific Coast Editor, C. R. Havighorst. To obtain material in all parts of the country, our editors travel extensively. And to accommodate more articles, the number of editorial pages was increased considerably a year ago.

EXECUTIVE EDITOR BECOMES CHIEF —The operation of this comprehensive editorial program will be under the overall direction of F. K. Lawler, who became Chief Editor on January 1. He served as Executive Editor under Acting Editor S. D. Kirkpatrick, well-known Editor of CHEMICAL ENGINEERING, while the new program was being set up. Mr. Lawler came with FOOD INDUSTRIES in 1932, and was Managing Editor from 1939 to 1945. He then served successively as Editor of the Production Department of BUSINESS WEEK and Editor of the McGRAW-HILL DIGEST.

F. K. Lawler becomes Editor.

We Think . . .

▪ Illinois Tech Has a Sound Formula For Technical Training

There are two outstanding things about the curriculum established by Illinois Institute of Technology for training technical men for the food processing industries. First, emphasis is placed upon engineering. Secondly, the courses involve working part of the time in food plants.

Certainly technical men in food processing plants need to know food plant engineering, just as those in the chemical process industries need to be trained in chemical engineering. It has been said of the engineer that he knows how to put technology to work on a practical and profitable production basis. There is nothing the food industries need more than men who can do just that.

As M. E. Parker points out in his article in this issue, the food industries have been employing chemical engineers in order to get that kind of knowhow. But these men have been handicapped to some extent by a lack of training in the biological sciences so important in food processing.

Not only is there a definite niche for the food engineer, but we believe that he will be more in demand than the food technologist without engineering training. This is something that other schools, which train men for careers in the food processing industries, might well think about more seriously. And it might be to the advantage of the schools and their students to give degrees in food engineering. If that is what food processors want, give it to them. Certainly more technically trained men are needed in the industry.

While several schools are giving courses in food technology—some with a little engineering included—the number of students taking such courses is much too small. A large university, which graduates electrical, mechanical, chemical and civil engineers by the hundreds, will have only a handful of food technology students. That this is sadly out of proportion is evident when one considers that the food manufacturing and processing industry is the largest of all industries—and it involves more complex technology than most.

Cooperative training—the second unusual thing about the Illinois Tech courses—has a three-fold value. (1) It provides the students actual experience in industry, giving them a good perspective of the value of their studies and causing them to assimilate more useful knowledge. (2) It better qualifies them to step into a job in industry. (3) And it enables them to earn money while going to school. In these days of high living costs—and with GI benefits petering out—the ability to earn something in school may mean the difference between getting a college education and being denied that privilege.

We wish Illinois Tech success in its program. It certainly seems to have been set up on a sound basis.

▪ Industrialization of Other Countries Means More Business

There seems to be a bit of loose thinking among business men as the effect of industrialization of other countries on the demand for consumer products from the United States. Some are saying that as the countries build up their industries, they will buy less from us.

That is only a half-truth. True, they will buy less of some things, because they will be getting those things at home. But industrialization will increase the buying power of the other nations. It will put more people to work at higher paying jobs and thereby raise the standard of living. The higher standard will increase the number of things people want, including American processed foods. The higher incomes will provide the money to buy such things. And the trend is one that pyramids to higher levels, except for interruptions brought about by wars or by economic maladjustments.

The faster the world industrializes, the better for all nations, provided only that the trend to drop international trade barriers continues so that the one-world economic concept can become a reality.

Realization of that concept, incidentally, would do more to assure peace than the best efforts of statesmen and the military combined. It also would make more of everything available to everyone.

▪ Polls are Accurate Enough for Business Purposes

Now that the excitement over the wrong-way election polls has passed, one can look objectively at the accuracy of sample polling. In a broad sense, the polls were correct. They indicated that nearly as many people would vote for one major candidate as for the other. And that is what happened.

Business men who want to check public acceptance of a new product, the effect of an advertising campaign, or what the public thinks about their company ought not to drop the polling method in the belief that it is meaningless.

If a poll indicates that 53 percent of the people prefer your product, and 47 percent a competitor's, it doesn't make much difference if there is enough error to reverse the figures, or to change them a few percent. The poll still shows that you have a pretty good product—but that you also have very effective competition. Therefore you better improve your product or increase your advertising, or both.

And remember that the election polls were determining the intentions of the public, not concrete facts about what people had done or not done. The accuracy of a poll determining how many people actually have bought your product and how many purchased from your competitor is not subject to the error introduced by the tendency of men and women to change their minds.

In a way, it is gratifying to know that pollsters cannot accurately measure the minds of men. If they could infalliby do this, your representatives in government might be guided entirely by the pollsters, not by you. We prefer the old American system under which you and I register our opinions directly.

▪ All Food Processors Should Note Canners' Nutrition Research

It took six years of research and an expenditure of $250,000 for the canning industry to determine the basic nutritive values of its products. This may sound like a lot of effort and expense, but consider what the canners got for their time and money.

First, they have the scientific data with which to do intelligent and effective promotion of canned foods of all types. Not only can the nutritive values be extolled in advertising, but home economists have constructive new information upon which to base menu, diet and cooking recommendations to homemakers. The medical profession, too, now knows the real values of canned products.

But the ammunition with which to push sales is the lesser of the long-range benefits from this research work. Most significant is the fact that the industry knows just what the present nutritive values of its products are and thus has a yardstick to measure the value of future improvements in processing.

Obviously, the canners know what they have produced by this research. Phase II of their program includes plant-improvement studies to develop methods and equipment which may result in still greater nutrient retention. This work will include an investigation of the effects of commercial storage.

Packers of frozen fruits and vegetables, as well as distributors of fresh produce, should take a close look at the nutritional findings of the canners and at the extent of their research program. Not only has the canning industry been improving quality for many years, but it is now giving the public facts and figures about the values of modern canned foods. With the canners in a position to make both cost and nutritive claims, they are going to further strengthen the consumer appeal of their products. As to convenience, canned foods have long had an edge—just heat and serve—no preparation whatever, not even defrosting. They can be stored anywhere, for almost any length of time. And how could any product be more suited to economical handling and selling in the wholesale and retail outlets?

You can't rest on your laurels in the food processing industry. Either you continue to improve quality and cut costs, or competition in the industry gets ahead of you. The canners know this well. That's why they have had the foresight to make steady improvement over the years.

▪ American Diet is Shifting Toward More Animal Products

Increase in consumption of animal products at the expense of vegetable products is being considered as an important and necessary trend of American diet. One argument is based on expediency. The other argument roots in supposed principles of nutrition. Let's look at both of these briefly.

The American diet is too high in starchy products, according to some nutritionists. They believe that a higher protein and fat component would make for better health of people living the less active life of the modern American. This means, obviously, that more meat, milk and like animal products would be desirable if they could be substituted for some of the starchy components which are now included in the typical diet.

The argument of expediency originates in the fear, probably justifiable, that during the coming years there will be a surplus of grains from American agriculture, beyond the needs of domestic consumers and the export market. If one looks forward to the end of the active European Recovery Plan, it is likely that there will be an important surplus problem of this sort. From this start, the argument proceeds to the conclusion that American farmers, in order to use their land more profitably, must market much of their grain in the form of meat, milk, poultry, and eggs. Obviously, the poundage so marketed per acre of land would be less, but the unit price per pound sold would be more than enough to offset the shrinkage in weight.

We do not pretend to know how fast the surplus factor and how fast the argument of the nutritionists may effect a change. But we do know that a change of the character here indicated has been going on for at least 40 years. The per capita consumption of cereal products has declined, while the consumption of animal products has steadily risen to more than 50 percent of the total food consumed. Presumably the trend has not reached an end.

These facts and these trends are not alarmist factors that forecast decadence of milling and the sudden rise in the milk products business. But they do represent trends which the long-view planners of each division of industry should study. They indicate the way in which research of long-time significance should be pointed if it is to have the greatest value in the permanent profit making of each industry and each individual corporation.

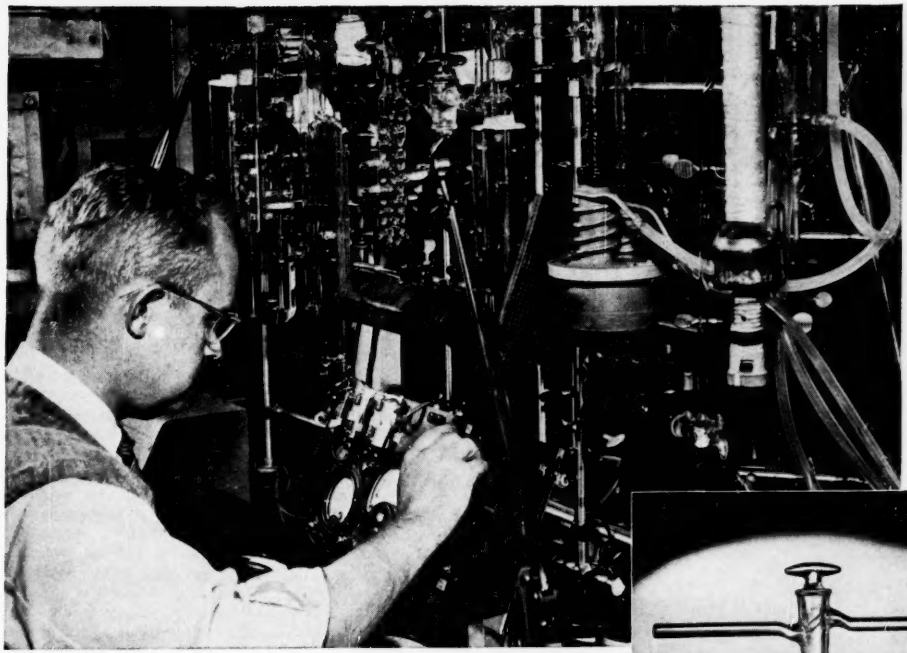
The leader of research thinking who does not take account of factors like these, regardless of whether he likes the trend or the argument involved, is in rather an unfortunate position. One cannot safely lie down in front of great economic shifts of this sort and expect that nature will stop the trend. Instead, nature will roll along, and the individual will be run over.

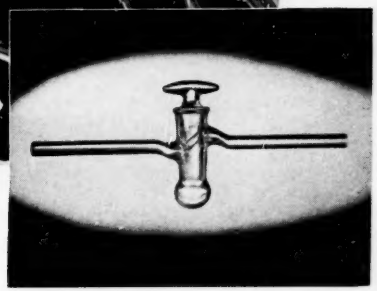
▪ Food Men Should Understand International Economics

As war and fast transportation have shrunk the world in a military sense, they also have made the problems of food technology world wide. We mean that the influence of our technology reaches everywhere and also that we feel the impact of the business of the whole world in our every factory.

Within the last few weeks we have seen three new international problems exert increased influence on our supply situation. Uncle Sam has had to beseech Canada for a potato agreement lest the balance of our agriculture in several important areas be again upset by tuber imports from the north. A complete system of import licensing on the majority of food fats and oils has begun to function under a license plan for 1949. And the Congress again is facing the necessity of establishing some sort of world-wide wheat price control lest U. S. surpluses break down programs for many foods seemingly unrelated to the greatest of food grains.

The point has been reached at which the food technologist must become an international economist in order to understand the full meaning of these problems. Perhaps the least that we can do while still in the primer class on this subject is to recognize the tremendous sweep of problems which we create and the backwash which we feel from others' problems far afield in geography and seemingly remote in their commodity nature.





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ABCB officers pose with retiring president: From left: Secretary John J. Riley; Past President Thomas F. Mansfield, Mansfield Bottling Co., Newark; President Truman M. Gill, Coco-Cola Bottling Co., Beeville, Tex.; and Vice-President A. G. Beaman, Seven-Up Bottling Co., Nashville, Tenn.

Higher Costs Trouble Bottlers

Producers of carbonated beverages also look for solutions to difficulties in processing and distribution

READJUSTMENTS resulting from the elimination of wartime controls, the return of competition—within and without the industry, and inflation, were the subjects in the foreground as 6,000 soft drink bottlers gathered in Atlantic City, in mid-November, for the 30th annual convention of the American Bottlers of Carbonated Beverages, and the second postwar international beverage exposition. The theme touched upon, directly or indirectly, by practically every speaker at the three-day general session, and at many of the special meetings, was keynoted by President Thomas F. Mansfield in his message at the first general session. "During the past year" he said, "we have experienced the full impact of many postwar competitive problems. That same thing has been true in other industries competing with us for the consumer's favor. As we look at our own problems, therefore, we must not be misled by the importance they assume in our own eyes. Rather, we must get some comfort from the fact that responsibility for the solution of many of them is shared with other important segments of American business."

Industry Problems

Current problems of the industry were discussed at the Wednesday general session by a panel of leading bottlers. The panel members were: John F. Leary, Newburyport, Mass., moderator, R. A. Jolley, Greenville, S. C., James Vernor, Detroit, Mich., A. B. Hatcher, Charleston, W. Va., A. G. Beaman, Nashville, Tenn., Edward Wagner, Cincinnati, O. and Paul F. Glaser, Seattle, Wash.

This discussion revealed that higher costs were anticipated, principally because of higher labor costs and a probable increase in the price of sugar due to restrictions on import of this commodity; that the level of profits during the next five years was expected to be below that of prewar; that by budgeting his whole program, the bottler with limited capital—provided he had not over-extended his resources—could be expected to survive, and that the small independent bottler who had started in business before World War II was in better shape to withstand the present pinch than other bottlers.

Vending Machines

On the subject of delivery and merchandising, a revision of bottle and case deposits to cover present replacement costs was advocated. A divergence of opinion was expressed regarding automatic vending machines. Mr. Hatcher felt that the small independent bottler should avoid this investment and concentrate on "direct to home sales." Mr. Beaman contended that "the product and the market were the determining factors rather than the size of the bottler. "There was a slight difference of opinion between Mr. Jolley and Mr. Beaman regarding the amount of rental to be charged on vending machines. Mr. Jolley advocating $8 per month on a machine costing $300. Mr. Beaman felt that $10, or approximately 15c per case, was necessary to cover depreciation, interest, installation, repairs, insurance, service, etc.

Selling prices were considered as "individual problems" governed by the law of necessity. Any attempt by the industry's association to set prices "is illegal." But the association may recommend that adequate prices be charged to insure a reasonable return on investment.

Increased costs can be partly taken care of by increased volume. But in many cases there is no alternative to raising price. This can be expected to meet with consumer resistance, which may cause a drop in volume. Methods of reducing costs advocated were introduction of labor saving devices and reduction of overhead.

On the subject of government limitations of sugar imports and the consequent higher price of this product, it was pointed out that a strong farm bloc coupled with the desire of the Sec'y of Agriculture to hold down subsidies to beet and cane growers in this country were important factors influencing restrictions.

Technical Meetings

The program of the four-day special sessions dealt with many problems. The opening meeting, presided over by ABCB vice-president Truman M. Gill, was devoted to aptitude testing and work simplification. Speakers were: Milton M. Mandell, Examining and Placement Division, U. S. Civil Service Commission, Washington, D. C. and Allan H. Mogensen, Director of Work Simplification Conferences, Lake Placid, N. Y.

The Tuesday afternoon meeting was opened by Dr. Robert G. Hockett, Scientific Director, Sugar Research Foundation, who spoke on the subject, "What About Soft Drinks and Nutrition." The remainder of this session was devoted to presentation of the ABCB Sales Promotion Program and a panel discussion of the program.

Wednesday's special meeting was devoted entirely to technical problems. Speakers were: Henry E. Medbery, Technical Service Director, ABCB, Warren M. Zuckert, The Permutit Co., and Dr. William L. Mallman, Michigan State College.

Speaking on "Current Beverage

Water Problems," Mr. Medbery stated that "The ABCB technical service has been much concerned over several additional water problems coming to its attention from time to time." He cited three specific cases as illustrations. In conclusion, Mr. Medbery stated "Water is never simply H_2O. Its use should be governed by the same rigid specifications that accept or reject flavoring materials or any other ingredient used in the manufacture of high quality bottled carbonated beverages."

Water Treatment

Mr. Zuckert listed five requirements of completely suitable beverage water in his talk on "Modern Water Treatment—The Key to Better Beverages." He pointed out that beverages made from even the best of city water could be improved by the installation of modern treating equipment.

Dr. Mallman, in his talk "The Control of Bacterial Contamination in Water Immersion Bottle Coolers," reported on studies of conditions pertaining to bacterial contamination of water cooled dispensers, wherein the server or customer has access to the bottles and the cooling water. He suggested that a chemical sanitizer be added to fresh water each time a cooler is cleaned to prevent buildup of bacterial populations.

The Thursday special session was devoted to product control and distribution. Harry E. Korab, of ABCB Technical Staff discussed the subject "Product Control Cuts Cost; Builds Sales," and M. W. Brenner, Schwarz Laboratories, New York, presented a paper "Air in Bottled Carbonated Beverages." "The Bottle Vending Machine as a Merchandising Medium" was the subject to be discussed by two speakers: G. R. Schreiber, Editor, Vend Magazine, and Arthur E. Yohalem, National Bottlers Gazette. In the absence of Mr. Schreiber his paper was presented by Mr. Medbery.

General Sessions

The matter of higher sales volume as a measure to partially offset increases in cost was given much consideration at the general sessions. At the first of these sessions, Gene Flack, Sales Council and Director of Advertising, Sunshine Biscuits, Inc., named 15 important factors which salesmen can use effectively in contacting prospects and consumers, and in combating the negative propaganda which is wittingly and unwittingly spread by many people.

Other talks emphasizing the same prineiple were given by Jack Lacy, President Lacy Sales Institute, Boston, Mass., James E. Gheen, New York, and Elmer Wheeler, Tested Selling Institute, New York.

Beverage Exposition

Displays of the 285 exhibitors completely filled two floors of the huge convention hall. Among the equipment displayed greatest emphasis was placed on labor savings. Outstanding in this field were: A case unloading unit which removed empty bottles from cases and placed them on a conveyor to be fed to the bottle washer; several new case loaders; a machine which opens cardboard carriers, loads them with filled bottles and discharges the filled carriers onto a conveyor; a loader which automatically fills carriers manually placed in cases and a new bottle washer which removes bottles directly from cases. Among the new items in processing equipment were several sirup coolers. One was attached to a newly developed, smaller carbo-cooler.

New Officers

At the final general session on Thursday new officers for the coming year were nominated and elected. They were: Truman M. Gill, Beeville, Texas, President, A. G. Beaman, Nashville, Tenn., Vice-President, Joseph LaPides, Baltimore, Md., Treasurer. New directors elected were: Edward F. Wagner, Madison, Ill., John W. Davis, Roanoke, Va., James H. Carmichael, Jackson, Mich., R. A. Jolley, Greenville, S. C., and Jos. F. Nerney, Attleboro, Mass.

Renewed contacts brighten 40th meeting, as—

GMA Takes a Look at the Future

Grocery manufacturers get an overall economic picture, study distribution, and learn food buying trends

CRITICISM of all American industry for setting its production sights too low, and a conclusion that high quality is still the most vital factor in achieving satisfactory grocery product sales, won close attention from food manufacturers at the 40th annual meeting of the Grocery Manufacturers of America, in New York, last month.

Sumner Slichter, Lamont Professor of Economics at Harvard, expressed confidence that American industry had the know-how to meet the tremendous demands that are about to be made upon it. His doubts concerned the kind of market analysis business leaders are likely to make. Will these men, he asked, see the tremendous increase that is occurring in the demand for goods, and will they make proper plans to increase the capacity of industry to meet these demands? This, he said, is the paramount question which the political trends of this generation present to American business.

In reaching his conclusions, Professor Slichter first set forth the best possible case for expecting an early recession. 1. The boom is no doubt

(*Turn to page* 190)

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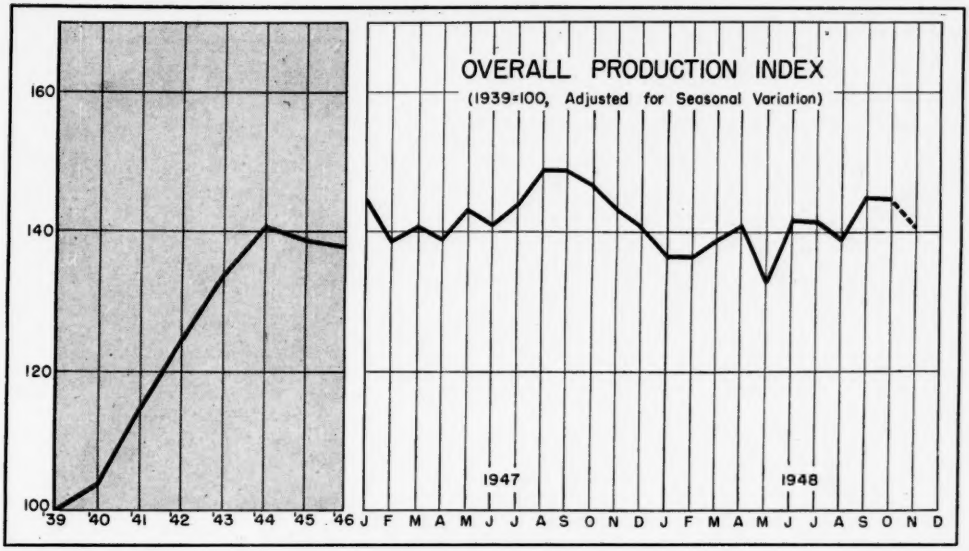
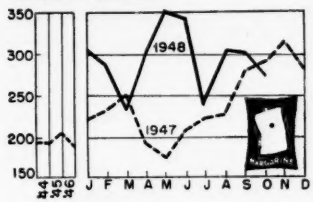
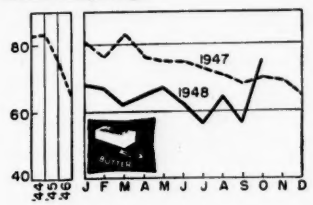
Food Industries Index


OVERALL PRODUCTION INDEX
(1939=100, Adjusted for Seasonal Variation)
160
140
120
100
'39 '40 '41 '42 '43 '44 '45 '46
1947
1948
J F M A M J J A S O N D J F M A M J J A S O N D

Margarine Falls Off



Butter Jumps High



Overall Food Production Takes a Tumble Though Butter Reaches New High

Latest index reading (preliminary) and comparative previous-month figure (revised) are now shown each month in the new "spot" indicator on FOOD INDUSTRIES' *cover.*

Preliminary figures indicate that processed food production declined about 3 percent in November, after allowance for seasonal factors. This brought our FI index down to 141 from its 1948 high point of 145 reached in September and October. Except for temporary spurts in demand, food output has held fairly close to the present level of 140 percent of 1939 throughout the past four years. Production for the last two months was only slightly below the corresponding months in 1947.

The index of margarine production took a steep drop in October, demonstrating the drastic fluctuation to which this particular index is subject. The variations that take place from month to month in margarine production are, actually, even greater than shown on the chart. A seasonal high point is reached about February, which is far above the seasonal low point normally occurring in August.

FOOD INDUSTRIES adjusts the actual production totals to take account of this seasonal variation. The adjusted figures are then comparable on a month to month basis. But they still show wide swings.

Margarine makers are fortunate in being able to increase or decrease production rapidly in the light of market conditions. Their technical process facilitates this. And the rapid changes that take place in prices of both their raw materials and their finished product make it advantageous.

Price Influences

The prices of vegetable oils used by margarine makers have shown wide short-term fluctuations since OPA ceilings were removed in October 1946. These prices are influenced by production of domestic oilseeds, by imports of coconut and palm oils, and by competitive quotations for animal fats. A change in the supply or demand for, any one of these can affect margarine makers' costs.

On the other hand, retail prices for margarine vary with the price of butter, which, in turn, is tied to prevailing prices for milk and cream. So more variables are added to complicate the problem of when it pays to step up margarine output.

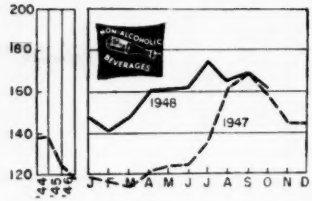
The long term trend of margarine

At a Glance—

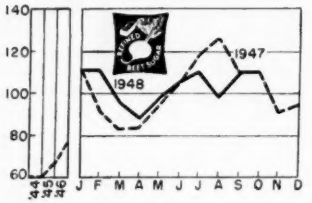
(1939 = 100 Adjusted for Seasonal Variations)

	Oct. 1948	Month Ago	Percent Change	Year Ago
Baking	144	143	+1	138
Beverages	161	168	−4	159
Butter	75	57	+32	76
Canning	143	145	−1	141
Cereals	144	130	+32	145
Condensed Milk	174	172	+1	175
Confectionery	148	144	+3	153
Flour	132	130	+2	139
Ice Cream	161	174	−7	191
Malt Liquors	151	161	−6	173
Margarine	274	302	−9	294
Meat Packing	160	159	..	160
Sugar, Beet	111	111	..	111
Sugar, Cane	72	86	−16	109

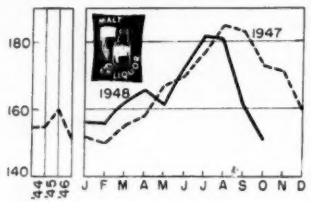
Beverages Start Drop



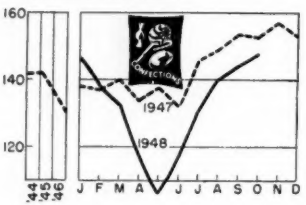
Beet Sugar Stays Put



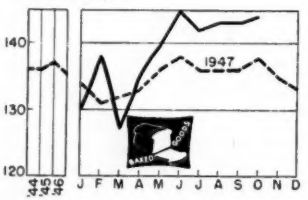
Malt Drinks Still Falling



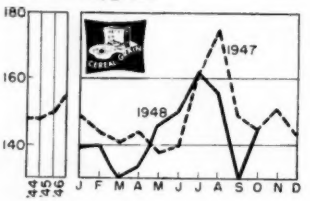
Confections Still Climb



Baking Rises a Bit



Cereals on Upgrade



production has been upward for the past two years. Despite temporary ups-and-downs in production cost, margarine is substantially cheaper to produce than butter and has grown in consumer demand by underselling the creamery product. Butter production has been skidding since 1944.

Both Should Increase

The 1949 outlook is for higher production of both margarine and butter. Bumper 1948 crops of oilseeds insure an ample supply of vegetable oils for margarine makers. Production of edible vegetable oils in the year beginning October 1948 may top the previous season by 15 percent. And butter output should be helped by an expected increase in milk production and a decrease in the proportion of milk sold in fluid form. As the curve of butter production starts up, margarine will show less spectacular gains than it did in 1948, when butter was harder to get.

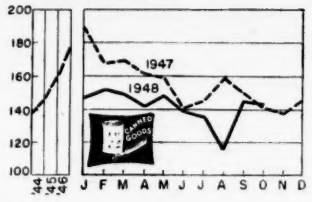
Increased output of vegetable oils from our own oilseed crop, plus increasing imports from the tropics, should result in lower prices for fats and oils products during 1949. The decline will probably be moderate, because of lower stocks than last year and strong export demand. If butter prices are simultaneously lowered by the improvement in cream supplies, margarine producers will be compelled to pass their cost savings on to consumers. Their prices should drop in response to declining prices for vegetable oils.

Retail Prices

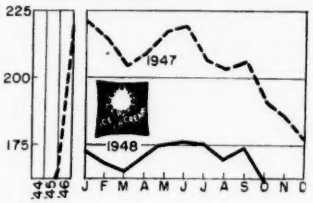
The prospect of increased butter and margarine output in the coming months affected the price of both commodities during October. Butter, in particular, dropped more than 8 percent to a national average price of 77c a pound. This decline was partly responsible for a greater-than-seasonal drop in retail food prices. From mid-September to mid-October, the Bureau of Labor Statistics' retail food price index was off 1.7 percent.

However, retail food prices declined chiefly because of a drop in the price of pork. Other meats followed suit. Hogs were moved to slaughter somewhat early this year because of drought in certain areas. And this greater-than-seasonal movement affected prices. Meat supplies will continue to grow and influence prices in the months through February, but a good deal of this seasonal rush has already taken place. Meat production is still lower than last year. So retail food prices are unlikely to drop precipitously in the near future. In fact, the prospects for most foods appear bright through the first half of 1949.

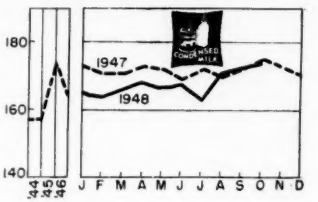
Canning Turns Down



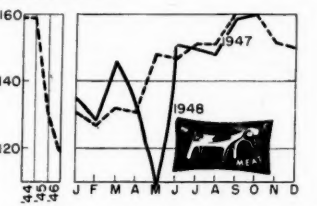
Ice Cream Falls Again



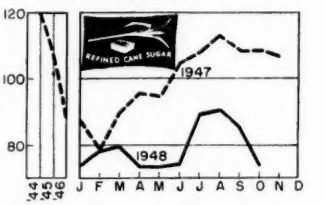
Condensed Milk Stays Up



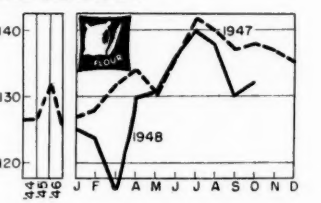
Meat Holds On

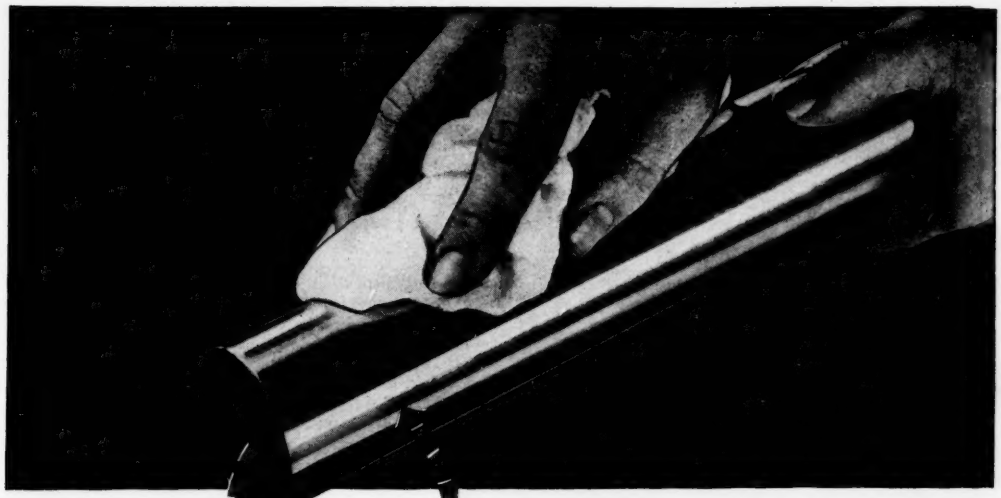


Cane Sugar Drops More



Flour Starts to Lift





INSIDE AND OUT

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New Packages and Products

Jellies In New Carry-Out Carton

A convenient, easy-to-display, and handy-to-carry, carton containing three assorted flavors of apple-base jelly is the latest special item introduced by the D. B. Scully Syrup Co. of Chicago. Developed from the results of surveys which show that over 60 percent of jelly sales are made upon impulse, the new carton is designed to sell three glasses where one was sold before.

The package holds three 12-oz. glasses—grape, black raspberry, and pure apple jelly. The product is packed in thin-blown Anchorglass tumblers and sealed with machine-applied decorated Anchorvac T caps which are supplied by Anchor Glass Corp. of Lancaster, Ohio.

In addition, the cartons let the purchaser see what is inside. The handle facilitates carrying. This medium of selling also gives a simple way of providing a variety of jelly flavors in the home—besides increasing the food's consumption. It is reported that the new package is meeting with favorable consumer acceptance.

Deviled Crab for Quick, Easy Serving

A dinner-for-eight package containing two 7½ oz. cans of vacuum packed deviled crab and eight shiny, sanitary crab shells is being introduced in eastern markets by the Blue Channel Corp., with headquarters at Beaufort, S. C.

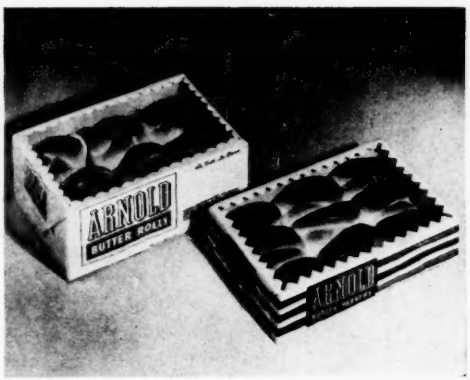
The deviled crab is prepared as an inexpensive, tasty product that can be quickly baked in the shells as indicated. It also may be sliced and fried in deep fat as crab cakes, or used as a salad or spread.

The manufacturer reports that this unusual item is available at a price lower than plain crab meat or other types of canned seafoods because of the development of a mechanical method of extracting the meat.

Fancy white crab meat and brown claw meat, the company's other products, are, however, hand picked and are offered in 6½ oz. and 15 oz. cans.

The deviled crab is also packed in a larger can with net weight of 1 lb. and the shells are supplied separately in cartons of six. Products are made from the Blue crab, which is found along Atlantic and Gulf coasts.

The red-white-and-blue colored labels and boxes were designed by the C. L. Miller Co., New York City.



Package Changeover for Baked Rolls

The entire production of butter rolls and butter parkers produced by Arnold Bakers, Inc., Port Chester, N. Y., is now being distributed in a new tray-type, "crash-proof" package. The standard cellophane bag type of packaging has been discarded.

This move was made following five months of careful testing in selected areas. There were excellent sales increases of goods in the new dress, without the benefit of special promotion.

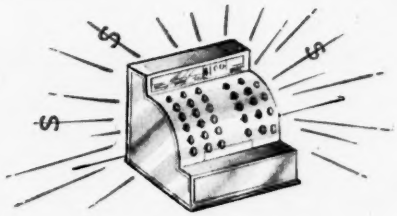
The package consists of an oblong cardboard box wrapped in printed cellophane that leaves the products visible through the top. Decorative imprinting along the edge of the window adds a distinctive dressy appearance. The Arnold logotype of bold open lettering is given prominent display on the side and end panels.

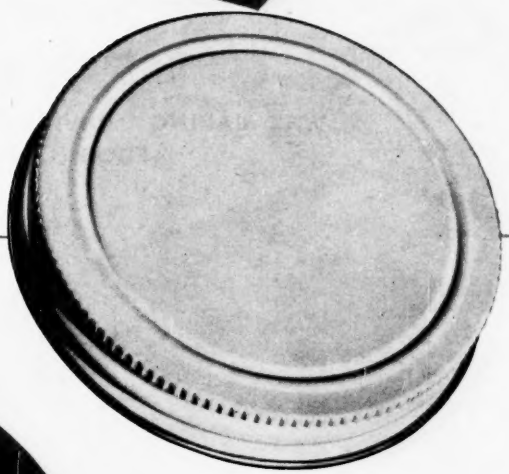
Color scheme is white with black and red panels for the butter rolls, and alternate stripes of brown and yellow for the butter parkers.

Spokesmen for the eight-year-old baking concern attribute the success of the new package to its greater eye appeal and to the protection afforded the rolls, from oven to the consumers' table. Shelf life is lengthened, appearance is enhanced, and the grocer enjoys bigger sales. In addition, the boxes stack well and give a fine display.

(Continued)

WHICH CAP WILL SELL THE MOST GOODS?





There's no question about it, a good cap design can help move your product off the store shelves, make the cash register ring. This "before and after" illustration is an excellent example of how Armstrong's expert package designers can take a blank metal cap and emblazon your name or trade-mark right on the top, in crisp, eye-catching colors. Armstrong's designers will be glad to show you how your metal cap can be made to sell for you. An effective sales message can be added in color for a fraction of a cent per cap. For design suggestions, send sample package and market information to Armstrong Cork Co., Glass and Closure Division, 4201 Prince Street, Lancaster, Penna.

Armstrong's Closures

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

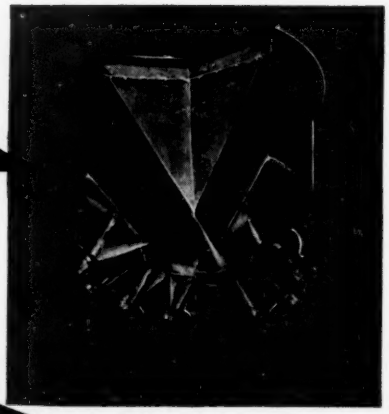
WEST COAST REPRESENTATIVE: I. F. SCHNIER CO., INC., SAN FRANCISCO 7 AND LOS ANGELES 12

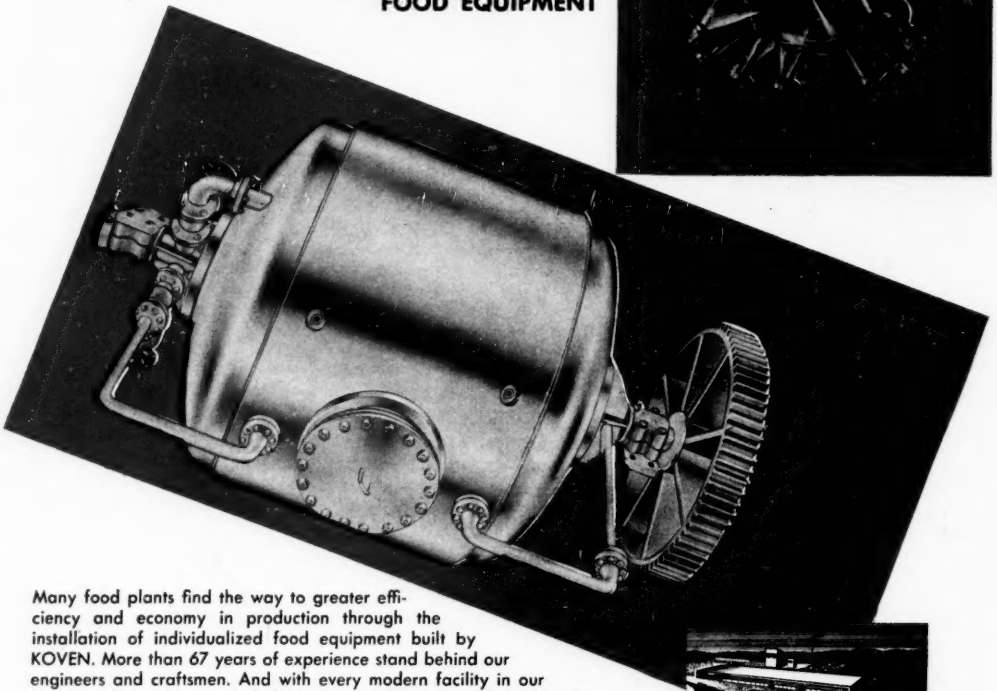
BACK IN THE 1880's

WHEN FAURÉ DEVELOPED THE FIRST STORAGE BATTERY

Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT





Many food plants find the way to greater efficiency and economy in production through the installation of individualized food equipment built by KOVEN. More than 67 years of experience stand behind our engineers and craftsmen. And with every modern facility in our two vast plants, they can help solve your production problems. At your service: machine, welding, painting and galvanizing shops. X-ray inspection insures quality control.

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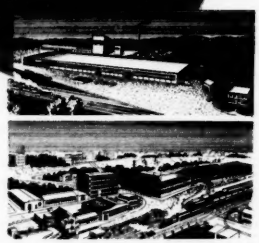


PLANTS:
Jersey City, N.J. Dover, N.J.

L. O. KOVEN & BRO., Inc., 154 Ogden Ave., Jersey City 7, N. J.

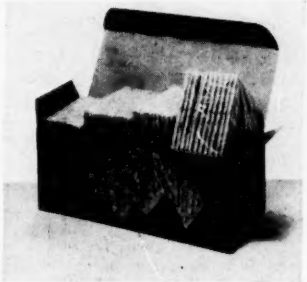
KOVEN FOR INDIVIDUALIZED FOOD EQUIPMENT SINCE 1881

New Sherbet Dessert Mix

Lemon, orange and imitation raspberry flavored sherbet mixes are the latest innovations to the "Junket" Brand Foods, Division of Chr. Hansen's Laboratory, Inc., Little Falls, N. Y. The basic recipe of preparation —an interesting, consumer-appealing, economy feature—calls for the addition of equal portions of milk and water to be whipped with the mix, then frozen in the ice tray of an automatic refrigerator. An excellent water ice also can be easily made.

The package, designed by Jim Nash of New York City, has a net weight of 5 oz. and features a full color photo of an attractive dish of sherbet of the flavor contained within. Further identification is gained in the upper right hand corner of the box by the use of a prominent initial letter denoting the flavor.

At present, the new mix is being market tested in several key areas before being launched on a national distribution program.

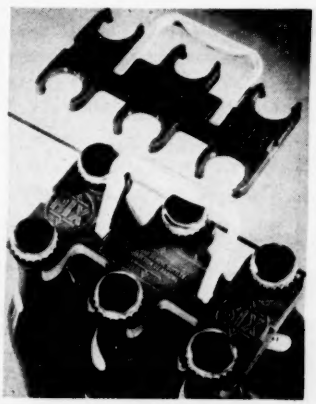


New Package of Crackers

A unique packaging idea has been developed to open up new merchandising possibilities in the marketing of soda crackers. The usual 1-lb. box has now been subdivided into four ¼-lb. units of crackers, individually wrapped in moisture-proof cellophane, and packed four to a box.

These neatly wrapped "meal size" units offer definite advantages to both manufacturer and consumer. Breakage is decreased, flavor is protected, and crispness is assured even in extremely humid weather

Battle Creek Bread Wrapping Machine Co., Battle Creek, Mich., made this packaging innovation possible by modifying one of the standard machines to permit the secure wrapping and sealing of loose crackers without a bottom card, tray, or other support.



Beverage Merchandiser

A plastic bottle carrier, named Pix-Six, has recently been introduced as an aid in retail beverage merchandising. Molded of rigid, durable Tenite (cellulose acetate butyrate), it has tough, resilient prongs which snap

(Continued)

DON'T KILL THAT GOOSE –

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Product Improvement is frequently as essential as plant modernization for "profits production".

If sales are slipping, let us bring a new look to your sales picture through improving the product, processing, and packaging. Such well may fatten your "profits production".

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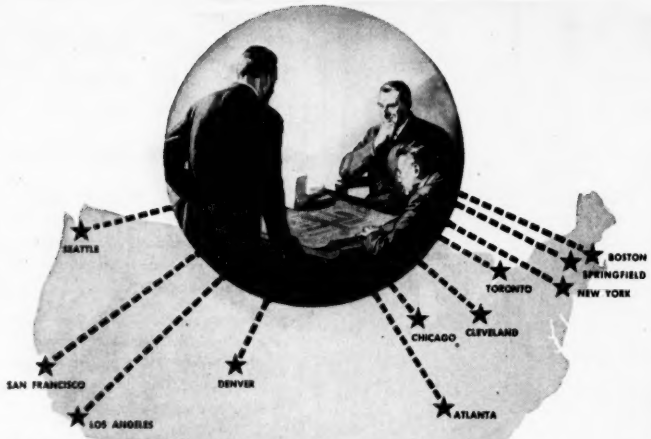

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All Package Machinery Company offices are staffed by men with the technical knowledge and experience to give you valuable assistance in the solution of your packaging problem. And they're backed by an organization that has developed the most widely used line of wrapping machines in the country . . . Our engineering and designing staff will be glad to study your requirements and make concrete recommendations.

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SEATTLE TORONTO MEXICO D.F.

securely onto the bottle necks and hold them so they cannot jiggle or drop out. To load, a slight tipping of the bottle is all that's necessary; and a flick of the thumb does the releasing.

The holder is so designed that it will not tip with one to six empty or full bottles of 6-12 oz. capacity. Empty, with handle folded down flat, the carrier fits easily into purse or pocket.

Manufactured by U. S. Plastics Corp., Chicago, of material supplied by Tennessee Eastman Corp., the carrier is chip-proof, easily kept clean, and highly resistant to impact.

Peanut Butter Minus Nut Hearts

A new peanut butter labelled Lady Corinne is now being marketed in the Midwest area by the Martin Food Products Co. of Chicago. It is made from Virginia peanuts from which the nut hearts have been removed—termed a measure against possible bitterness or dark spots. It is ground, homogenized, reground, and the excess oil then removed to assure a smooth spread. Product is packaged in 12-oz. tumblers, 2 and 4 lb. jars, and No. 10 tins. It is also sold in bulk for institutional use.

Rapid-Setting Vegetable Gums

"Aqualized" gums, for use in food products requiring agents for thickening, dispersing, emulsifying, sizing or coating, have recently been released by Glyco Products Co., Inc., Brooklyn, N. Y. The new products, said to be a prime departure in the process-

(Continued)

Share the Full Wealth of Natural Flavor

with Ac'cent®

PURE MONO SODIUM GLUTAMATE

Ac'cent improves the flavors in most meat products, poultry, fish and vegetables in freezing or canning methods. Samples will be sent upon request along with more specific information outlining the suggested testing procedures. *Ac'cent* is available in 200 pound units for bulk purposes.

Today, it seems as if the entire food world is discovering the unique advantages of mono sodium glutamate. Although it is already a standard ingredient in many familiar food products, even greater opportunities are yet to be fully appreciated. With a few comparative tests, you can readily see how this vegetable seasoning builds up the flavor characteristics in many foods.

Ac'cent is mono sodium glutamate at its best. Produced solely from vegetable sources, it is over 99% pure—odorless, colorless, and adds no flavor of its own. Thus, *Ac'cent* increases the acceptability of many processed foods by providing a taste satisfaction that is rarely attained without it.

Extensive research has proved that *Ac'cent* balances, blends, and intensifies the total flavor effect without itself being noticeable. Mushrooms, corn, asparagus, green beans, lima beans, and broccoli are made more appetizing, and the natural flavor of carrots and cauliflower are more clearly defined. *Ac'cent* raises the flavor level of most meat, poultry, and fish products, and remarkably enriches soups, consommes, bouillons, and blended seasonings. Still, it actually suppresses some other undesirable flavor notes that have hindered the popularity of certain foods.

Ac'cent is now at the service of every food processor to help guard the true food flavors all the way from processing to the table. Basic formulas need not be altered and a surprisingly small amount is required to produce pleasing results. It blends well with all other seasonings and even emphasizes their effectiveness.

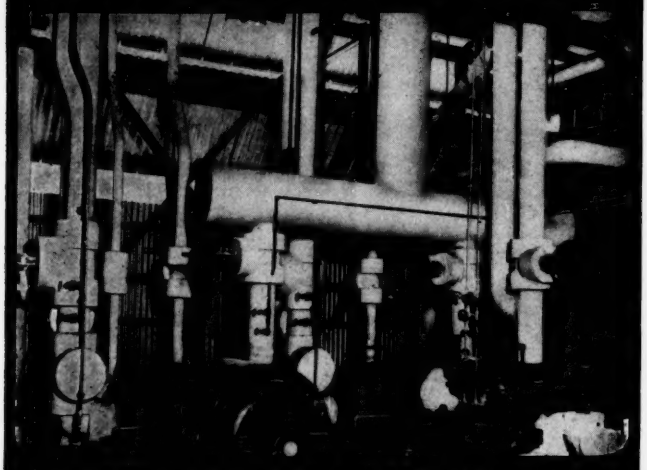
Try using the time-tested properties of *Ac'cent* in your own operation, and take full advantage of those flavors naturally present in your food products.

Amino Products

DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION • 20 NORTH WACKER DRIVE • CHICAGO 6, ILLINOIS

HERE'S YOUR SPECIFICATION



FOR ALL LAGGING WORK

Arabol Lagging Adhesive — designed specifically to hold non-conducting material around pipes, ducts, boilers — is now on the market. This adhesive is easy to apply; eliminates the time-consuming task of sewing. It dries in 4 to 6 hours, leaving a sized finish. Use it on canvas, asbestos, fiberglas or cork. Its finish need not be painted at all, unless you prefer one coat for appearance. Maintenance is simplified — grease, oil, soot and dirt wash off easily. In addition, this lagging adhesive is vermin-proof . . . fire-retardant, too.

You can depend on Arabol for a thorough job of adhesion. Rigorous tests by independent laboratories proved its adhesive strength despite exposure to extreme temperature, immersion in water, and steam.

Write us today for facts and case records. For utility and appearance don't place open specifications on lagging work - ask for Arabol Lagging Adhesive. Also — ask about our cork cement for adhering cork to cork on refrigerator lines.

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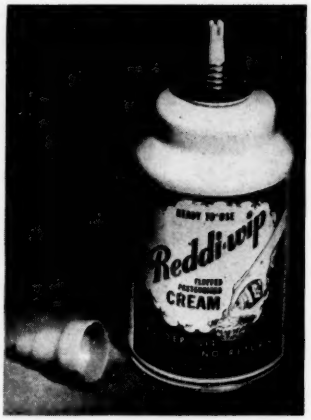
Adhesives?... ARABOL!

ing of vegetable gums, are derivatives of tragacanth and karaya. They can be dissolved in a few minutes. Their set is reported to be rapid and thereby does not require alkali treatments, boiling, or dilution with sugar, gylcerine, or alcohol. Use of the new gums is reported to save processing time while doing away with straining or filtering.



Fluffed Pasteurized Cream

A throw-away container of rich, aerated topping, made from pure pasteurized cream, stabilizer, sugar and vanilla, with carbon dioxide and nitrous oxide added, is now offered by Reddi-Wip, Inc., of St. Louis.

Specially designed by Crown Can Co., the container is of 12 oz. capacity and is lithographed in an ivory overcover with blue and red printing. A removable red plastic cover fits over the top of a small extended valve tip, which is held taut by a spring. Inverting the can and pressing the side of the tip releases a swirl of the fluffy mixture.

The product is offered to dairies on a franchise basis. It is especially recommended as an ideal "foot in the door" for obtaining new customers.

Grease Resistant Film

A water-clear transparent vinyl identified as Reynolon 3000T is being produced in thicknesses of 1.5 and 2 mils by the Plastics Division of Reynolds Metals Co. It offers advantages in the packaging of fresh as well as processed foods.

The new product is a vinyl film modified with non-extractable and non-migrating soft resin. It is stated to be resistant to greases and solvents and not to be volatile in the presence of heat.

These grape flavors WILL BUILD YOUR SALES!

Our concentrated grape flavors are a brand new, full-bodied type, that candy and extract manufacturers have found immediately valuable. They are part of our large selection of highly concentrated, uniform, and stable imitation flavors being offered in the United States for the first time.

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These well-known products are packaged at lower cost with General Mills Machines

Looking for faster, cheaper packaging for your product? Take a tip from some of the nation's top manufacturers—investigate the cost-cutting results offered by General Mills' line of specialized equipment.

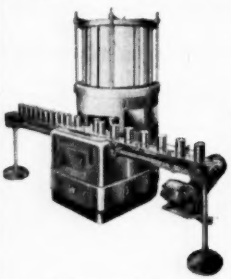
VACUFLOW POWDER FILLERS

MODEL E

Fills bulk containers up to 200 pounds in capacity. Operator positions containers and the machine fills them to a precise weight automatically.

MODEL D

Handles small and medium-size containers fed manually. Ideal for the manufacturer with low tonnage production on a wide range of products.



ROTARY MODEL

Fills up to 300 containers a minute automatically. Handles a wide variety of sizes of cans, jars, small-mouth bottles and cartons. Available with 8, 12, 16, or 24 filling heads.

These machines use a new precision method of *drawing* powdered products into containers by means of an intermittent vacuum. This permits complete control over weight and density of powders, resulting in amazing accuracy and high filling speeds. All working parts are completely dust sealed; filling rooms offer clean, dustless working conditions.

TRAY-LOCK MACHINE

Forms lock-type trays and cartons

FINISHED-EDGE CARTON FORMER

Sets up open-top double-wall trays and cartons

Completely automatic, these machines deliver ready-to-fill trays and cartons at speeds up to 90 per minute. Both units produce a wide variety of tray and carton sizes and styles, all neatly squared with sturdy, straight sides. Either machine plugs into your regular 110-volt circuit.

Full details regarding any of these machines will be sent on request. Address Dept. F19, General Mills, Inc., 1620 Central Ave., Minneapolis 13, Minn.

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Food Industry News

Food Industry Planning to Sit Tight During Delivered Pricing Hubbub

Food processors who have been worrying about the possible impact of the delivered pricing controversy on their own business have come to one conclusion, along with other manufacturers: There is going to be no quick remedical legislation from the 81st Congress.

For a few weeks after the Capehart Committee got its investigation of the cement institute decision and FTC pricing policies underway, it appeared that little significant opposition to legislation would develop. However, Wright Patman—a skilled and experienced leader in this field, as the food industry well knows—laid down a blast at the Capehart group, revealing that he was ready to take up the battle to uphold the FTC's views.

This is part of the motivation behind the organization in Pittsburgh, last month, of a multi-industry organization—the National Competition Committee—to carry on a continuing campaign for legalization on delivered pricing, which is now under question. This committee will devote its efforts to the single objective of getting legislation that will specifically guarantee the legality of one seller absorbing freight to meet the competition of another seller who is closer, freight-wise, to the customer.

Over the years, delivered prices have become the trend among food processors. It is estimated by one of the largest chain store companies that about 70 percent of its foodstuffs come to its stores at a delivered price. Such food retailers, and most distributors as well, actually are not worrying much about the delivered price situation. Either they dismiss a flat ban on all freight absorption as completely absurd and unworkable, regardless of the FTC or the Supreme Court—or else they feel that if f.o.b. selling becomes the universal rule, they will fare as well as their competitors.

Among the first in the food field to be represented before the Capehart Committee were the sugar beet growers and processors, who declared unanimously that if they were not permitted to absorb freight to get their product into the populated markets, their industry would be shrunk to that required to supply only the small population of the areas immediately surrounding the best sugar areas.

The flour milling industry also testified against any rule that would compel f.o.b. pricing of all products. A peculiar historical freight arrangement to the flour and grain industry is "milling-in-transit," which gives the millers a favorable freight rate deal that, in fact, equalizes freight costs. "Transit" would be ended if the rules of f.o.b. mill is applied across the board. A complete presentation on the subject, along with explanatory charts and maps, was made to the Capehart Committee, by Earl B. Smith, director of traffic, General Mills, Inc.

Another food industry directly affected is corn products refining, in the glucose operations—and there is likelihood that significant rearrangement of the industry, geography-wise, may occur if the ban on freight absorption carries through.

The impact of the delivered pricing—assuming that all freight absorption is outlawed—is being studied by the National Canners Association, but its results were not yet available as FOOD INDUSTRIES went to press.

At the moment, the biggest obstacle to clarifying legislation is the Congressional tendency against enacting controversial legislation if such a step can be avoided. The opponents of any clarifying law can plead, with a great deal of authority, that the impact of the Cement Institute decision cannot be determined when there is more demand for most products than the suppliers can produce. Hence, they argue that before the benefits or handicaps of the decision can be determined, the economy will first have to return to more normal conditions.

In the meantime, there is no question that most manufacturers and food processors are, in general, continuing their present pricing practices, whether f.o.b. or delivered pricing. Until the question is clarified, they feel that they are not fixing prices or acting otherwise in collusion, and hence they are continuing whatever pricing policy is the custom in their particular industry.

California Citrus Canner Leases Florida Plant

Indian River Citrus Cooperative has been formed to provide cannery fruit for the Treesweet Products Co., of Santa Ana, Calif., which has leased the Di Giorgio cannery at Fort Pierce, Fla., and expects to begin operations January 15.

The newly formed organization is headed by J. W. Martell, president; W. M. Moseley of Fort Pierce, vice-president; and Edward W. Poe of Vero Beach, secretary-treasurer. Sponsored by the Indian River Citrus League, it was formed to simplify and expedite the cannery setup.

Under the agreement, as announced by W. K. McCracken, president of Treesweet, the cannery fruit will be pooled from the entire Indian River area, and all not handled by Treesweet will be sold to other processors.

Treesweet is a pioneer California citrus canner and the largest in the State. It has plants in Texas, but this is the first venture in Florida.

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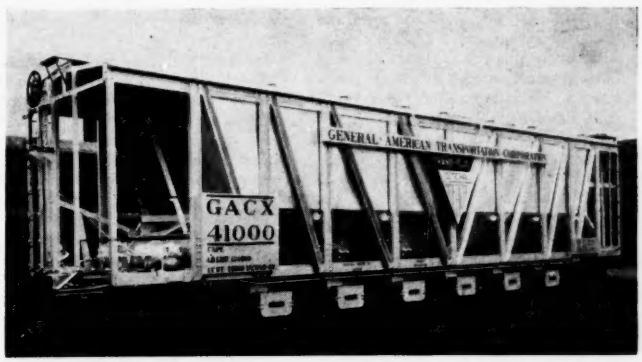
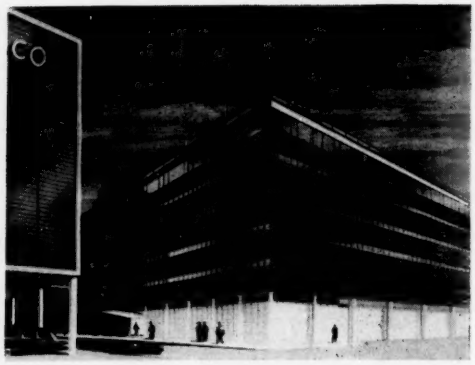


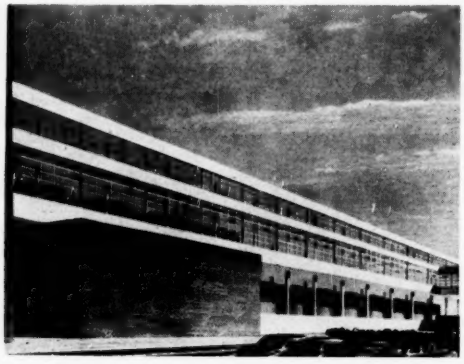
Test Bulk Flour Car

Designed especially for bulk shipments of flour, this car has been undergoing tests for the past month. Built by the American Transportation Corp., to handle finely powdered material, the car will be leased to the National Biscuit Co. after tests.

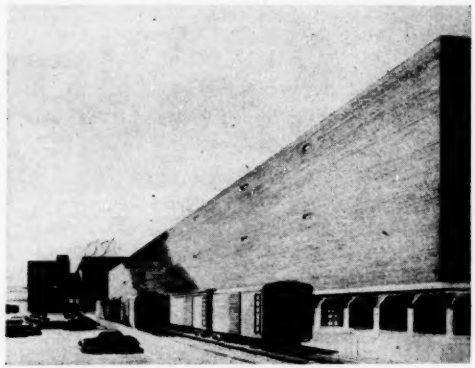
RESEARCH and Quality Control Center is one of the four new buildings designed to dovetail with present facilities in the H. J. Heinz Co. $15,000,000 building program.



FACTORY Administration building will be main plant entrance. It will provide dressing room, showers, medical facilities, along with offices for administrative personnel.



VINEGAR and Sauce building will incorporate the most advanced equipment for producing these products for the nation's largest maker of vinegars.



WAREHOUSE is largest of the four new buildings. A three-story windowless unit, it will provide 23 percent more storage space than is available at the present warehouse.

Huge Building Program Will Give Heinz Most Modern Pittsburgh Plant

A $15,000,000 building program, that will give the H. J. Heinz Co.'s Pittsburgh plant completely streamlined production and shipping facilities and provide one of the nation's most modern food research and quality control laboratories, has been announced by H. J. Heinz II, president of the company. Mr. Heinz told FOOD INDUSTRIES that "tonnage turned out at Pittsburgh has increased 52 percent since 1939. We busted out at the seams," he added, "and the company has to expand its facilities right now to keep pace with the demand for its products."

Erection of four new buildings and extensive changes in existing structures are called for in the program, which is a major part of the nation-wide modernization and expansion plan, revealed by the company more than two years ago.

The new buildings are: A stainless steel and glass Research & Quality Control Center; a finished-products warehouse, with 2,500,000 cu. ft. of space, which will have the most advanced materials handling technics; a Factory Administration Building; and a Vinegar & Sauce Building.

The new buildings, moreover, are designed to dovetail with existing facilities so as to create a smooth and continuous flow of incoming raw materials and supplies, from the shipping station through processing, packaging and shipping.

Stainless steel panels and light-diffusing glass blocks will be used in the construction of the Research & Quality Control Center. Five stories high, the building will have a complete pilot plant, occupying three and a half stories, four quality control laboratories — organoleptic, packaging, microbiological and analytical chemistry; three research laboratories— process and product, bacteriology, and nutrition; home economics kitchens; experimental kitchens; a scientific library; and a photographic studio.

Laboratories will be furnished with temperature and moisture controls to assure ideal working and scientific research conditions. Large glass areas have been planned for the laboratories so that operations may be carried on under natural lighting conditions as far as possible. Like the other new buildings, the Center will be built on "stilts" of steel and concrete. The normal ground floor level will be available for parking.

The Factory Administration Building will be a six-story structure with the "stilted" first floor area utilized

for loading platforms and truck docks. Employees entering this building will be able to reach any part of the Pittsburgh factory without going outside.

The Vinegar & Sauce Building will be three stories high. The ground floor area will provide space for the huge wooden vinegar tanks. This building will also serve as the control room for the factory's power plant, with turbo generators and air compressors located on the second floor. At the rear of the building, a series of grain elevators will provide a constant flow of grains for vinegar manufacturing.

Largest of the new buildings—the warehouse—will be a three-story structure, covering an area now occupied by three factory buildings and a half block of houses on company property.

The first floor will have a 10-ft. ceiling, while the other two floors will have 20-ft. ceilings to make possible the palletizing of goods in 17 ft. stacks. Twenty-four truck docks will be provided at the west end of the building and 26 at the east end. Railroad facilities will be located on two levels with 32 loading spots provided.

A master conveyor system will pick up packaged goods in all factory areas and deliver them for storage and shipping to the warehouse. Nearly all goods will be moved automatically, with branch conveyors feeding cased goods into the master conveyor. These goods will then pass on the conveyor through the new Vinegar & Sauce Building to the sorting center in the warehouse.

At the sorting center, photoelectric equipment will separate cases by size as well as by variety. Products will thus be unscrambled automatically from the master conveyor, and each variety will flow to the proper pallet loader. From the loader, products will be moved directly to loading platforms or storage areas.

Baking Industry Planning First Show in 12 Years

The first baking industry exposition to be held since 1936 is being projected to run simultaneously with the annual convention of the American Bakers Association, scheduled for Atlantic City next October 15 to 20.

Gerard R. Williams of Williams Bakery, Scranton, Pa., chairman of the management committee, disclosed that the entire main floor of the Atlantic City municipal auditorium will be used for the exposition.

Williams added that at this same time there would be held branch sessions of groups within the baking industry, as well as meetings of such related organizations as the allied trades of the baking industry and the Bakery Equipment Manufacturers Association.

Canning of Sweet Cream Achieved by Dairy

Successful canning of sweet cream has been achieved by Dairy Dream Farms, Inc., New York City, according to a recent company announcement.

The product made under a secret process can be handled without refrigeration until opened. Tests have indicated that the cream will withstand even tropical temperatures over extended periods, without affecting its character.

With complete control of the licensing, sub-licensing, manufacture and distribution, the company has contracted with a Wisconsin plant to process this virtually revolutionary product.

Present plans call for the production of an 18 percent butterfat cream and a heavy whipping cream. Currently, the plant has a capacity of 3,000 cases of 10-oz. cans per day. With minor alterations, however, it can step up production to 10,000 cases per day. Dairy Dream also expects to turn out a 46-oz. can of both light and whipping cream in the very near future.

A distinctive trade-mark has been designed and registered with the U. S. Patent Office, along with the trade name "Dairy Dream Pure Cream."

Standard Brands Is Sued Over Margarine Carton

The Cudahy Packing Co. filed suit, November 15, in the Federal Court in Wilmington, Del., against Standard Brands, Inc., asking for an injunction to restrain the latter from imitating its Delrich E-Z Color Pak margarine carton. Damages were also requested.

Cudahy was the first company to market its margarine in the Peter's plastic bag, which enables the housewife to mix coloring matter into the margarine by kneading the bag, and it has advertised it nationally for two years. Recently, Standard Brands started packaging its Blue Bonnet margarine in a plastic bag and made some changes in the carton.

The Cudahy Packing Co. alleges that Standard Brands has imitated its margarine carton to such an extent that prospective buyers are deceived, with loss of business to Cudahy.

Penn Candy Men Meeting

The third annual production conference of the Pennsylvania Manufacturing Confectioners' Association has been scheduled to be held at Lehigh University, Bethlehem, Pa., May 26 and 27, according to Hans F. Dresel, chairman of the conference committee.

Among the principal speakers will be John P. Bolanowski, who will discuss new processes for making marshmallow continuously, and Boyd R. Hopkins, who will present a paper on "Melting Chocolate Electronically." Both of these speakers are from the Girdler Corp. Louis Land, chief research chemist, National Sugar Refining Co., Philadelphia, will discuss "The Role of Sugar in Candy Making."

Texas U Offers Major Course In Pre-Food Technology

A new approach to a Bachelor of Science degree in home economics is being offered by the University of Texas in the form of a new major—pre-food technology—leading toward graduate training for a Master of Arts degree in food technology.

The new curriculum is comparable to pre-medical and pre-law training, Dr. Gene Spencer, professor in charge, said recently. The University took the step in anticipation that Texas food industries will expand, affording more jobs for trained personnel.

Among positions open to food technologists, Dr. Spencer said, are advertising and promotion-work posts in industries concerned with manufacture of food and home equipment; developing and testing of new products; testing, improving, and finding new uses for old products; and college teaching of the technological aspects of foods.

"Heretofore most of the positions requiring food technologists have been outside Texas, where salaries generally are higher," Dr. Spencer said. "But in the state, the need for technically-trained persons is growing as Texas industries develop."

NLRB Limits Exemptions For Food Workers

An important decision handed down by the National Labor Relations Board takes away an exemption granted to food processing operators done by workers, who heretofore have been considered "agricultural workers."

What the NLRB did was order that an election be held among the cannery workers of the Di Giorgio Fruit Corp's plant at Lucerne Park, Fla., to determine whether they wanted to be represented by the AFL.

Until this decision was handed down, the courts had generally held that the term "agricultural worker" included workers engaged in processing agricultural products grown on the farm or land of their employer. This followed NLRB's use of the definition of the Fair Labor Standards Act, which goes as follows:

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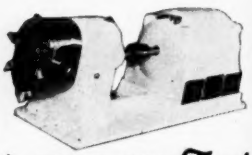
WATEROUS SANITARY PUMPS

STAINLESS STEEL and NICKEL ALLOY

100% SANITARY



for PUMPING Food Products of all Kinds

APPROVED BY ALL LEADING HEALTH DEPARTMENTS

POSITIVE ROTARY ACTION

ONE PIECE ROTOR AND SHAFT ASSEMBLY

Ball bearing construction throughout, here is a modern advanced design in positive rotary pumps for handling food products of all kinds. A simple, efficient design and construction that assures long efficient service, the heavy duty precision ball bearings control both radial and end thrust loads on shafts and rotors. Bearings and timing gears operate in oil to assure long life and quiet operation . . . no internal metal friction in the pumping chamber.

SLOW SPEED ELIMINATES AGITATION

NO THREADS, SPLINES OR KEYWAYS IN PUMPING CHAMBERS

SANITARY MECHANICAL SEALS

There are no internal shaft or seal threads to contaminate your product. All liquid contact parts are removable for easy cleaning. Its slow pump speed eliminates agitation or aeration of product being pumped . . . capacity is in direct proportion to the pump speed . . . Waterous Sanitary Pumps can be operated at speeds ranging from 50 to 600 r.p.m.

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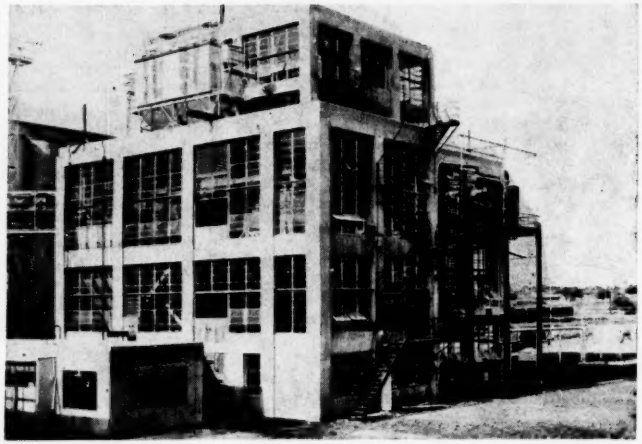


New Corn Oil Plant

Rated to handle 225 tons of prepressed corn germ daily, this new corn oil extraction plant was recently put into operation by Corn Products Refining Co., at Argo, Ill. The oil is later processed into a salad and cooking oil.

"Agriculture includes farming in all its branches and among other things includes . . . any practices . . . performed by a farmer or on a farm as an incident to or in conjunction with such farming operations, including preparation for market, delivery to storage, or to market or to carriers for transportation to market."

The board said that in the Di Giorgio case it had to decide whether the fact that the workers were engaged in processing fruits grown only on their employer's groves was in itself sufficient reason to exclude them from the National Labor Relations Act, regardless of the nature of the operation they performed.

Said the board: "The ultimate test is whether the services of the employees involved are performed in connection with a mercantile enterprise or an agricultural operation." And "if the practice is not actually required as a condition precedent to preparing the products for market, but is adopted in order to add greater value to the farm products, it acquires the attributes of a commercial venture."

So the board drew a sharp line between workers who pack or package fruit incident to preparing it for market, and workers who operate machines that cut up and transform fruit into juices, add other materials, and can the resulting product.

Despite the fact that these employees would have previously been exempt from the provisions of the law, the NLRB in the new ruling, has held that the commercial aspects of such a canning operation removes the workers from the agricultural (exempt) classification.

Aspects on Food Laws Shift As New Congress Arrives

The return to power of a labor-conscious, farmer-conscious Democratic administration casts a new light on some of the legislation affecting the food processing industry that will be proposed at this new session of congress.

But the list of measures to be put into the congressional hopper is impressive, especially since it now appears that the prospects of many of them are vastly changed from a year ago.

Canned goods under marketing acts: The so-called Pepper Bill will undoubtedly be brought front-and-center again. It would bring almonds, filberts and citrus fruits under the mandatory marketing orders of the Agricultural Marketing Agreement Act of 1937. The law's provisions make it possible for voluntary marketing agreements among growers, processors and others engaged in marketing the commodity to be applied involuntarily upon all persons engaged in marketing the crop from a particular area.

Citrus fruits for canning or freezing are not now covered, nor are any other fruits or vegetables for canning or freezing. But the Pepper Act, if it became law would establish a precedent.

Here are some of the things the secretary of agriculture could do (and now does for fresh citrus fruits, for instance, and other commodities):

Limit the total amount which a canner may pack.

Limit the total amount by grade,

size or quality which a canner could ship in interstate commerce.

Limit the amount of raw materials by grade size or quality which a processor may buy from particular growers.

Limit the amount of canned citrus which any processor may ship to a particular market.

Provide for surplus pools.

Provide for inspection and grading of all products subject to the order.

Require the processors to pay the cost of the program.

The program will be applicable whenever the secretary determines that a majority of the growers wants it. The particular orders and the provisions to be included will be applicable if two-thirds of the growers vote approval of the particular order.

Flexible Support

Farm price support: Look for an all-out, bitter fight over retention of the Hope-Aiken "Flexible formula" law, which is scheduled to go into effect next year (1950). It was passed as strictly a compromise measure with the express understanding that the law would be open to amendment.

Lined up to keep the Hope-Aiken law "as is" will be the leadership of the farm organizations, the Department of Agriculture and the Democratic administration, as such, a number of influential Republicans like Senators Aiken and Thye—plus most of the mid-Western grain, meat, and dairy farmers who believe that price supports are a good thing, and who prefer the flexible kind.

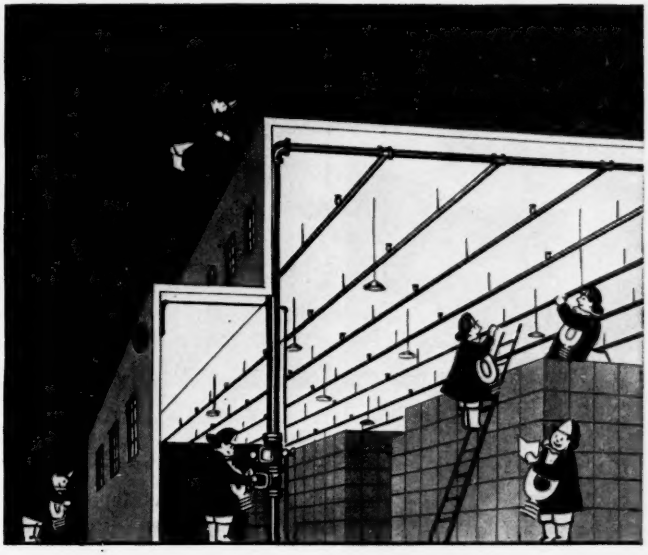
Fighting to put over a 90 percent mandatory support level (or even 100 percent of parity) will be important Southern Democrats, including the chairman of both the House and Senate Agriculture Committees, most of the southern congressmen and senators, and the southern cotton, tobacco, and peanut farmers.

Big Crop Looms

Struggle will be intensified if the wheat crop turns out to be another whopper. Possibility of such a crop is foreshadowed by the fact that farmers planted 10 percent more acreage to wheat last fall than the Department of Agriculture's official wheat "goals" had suggested.

If the yield per acre is better than average, a biggest-ever wheat crop is assured—and millions of bushels will be acquired by the government at 90 percent of parity under the price-support law. Such a development will sharpen the fight between those who want the flexible Aiken formula retained and those who want 90 percent support and controls maintained.

(Continued)



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FAO Leaders Meet in U. S.

Taking part in the fourth annual conference of the United Nations Food & Agricultural Organization, held in Washington, were (from left): U. S. Secretary of Agriculture Brannan, named chairman of the conference; Marvin Jones, first FAO director-general; Norris E. Dodd, present director-general, and Viscount Bruce, Melbourne Australia, chairman, FAO Council. The conference opened in December.

PROCESSING

Bread, Flour Standards Undergo Revisions

Flour bleached with chlorine dioxide is now permissable under the revised standards of identity for flour as promulgated by Food & Drug Administration on page 6969 of the November 27 *Federal Register*.

It was also ordered that nitrogen trichloride be deleted from the standards as a permissable optional bleaching ingredient effective August 1, 1949.

Also included in the standards amendment was permission to use, as additional carriers for benzoyl peroxide, any one of the following substances or mixtures of them with each other, or with those already prescribed as suitable for such use. Such substances are dicalcium phosphate, tricalcium phosphate, starch, sodium aluminum sulfate, and calcium carbonate. Effective date for this provision of the new amendment is February 25.

Bread has been exempted from labeling requirements of the Federal Food, Drug & Cosmetic Act of 1938 pending the promulgation of standards of identity. In 1941 hearings were held, and in 1943 a tentative order standardizing various breads was issued. Because of wartime complications, no final order was issued. On November 30, new hearings began to bring up to date the technical and economic facts in the 1941 hearings record, with inclusions of new pertinent testimony requiring changes in the proposed order of 1943.

A tentative schedule for the hearing was laid out on the first day. From the length of time required for direct testimony, as estimated by various interested parties, the hearing will continue until March, with a long recess for Christmas and Washington's inaugural program. Total of estimated times of presenting direct testimony amounted to about four weeks.

Principal discussion will be devoted to use of the following ingredients in various breads: Soy flour, milk products, emulsifiers ("bread softeners"), and oxidizing agents. Other specifically named ingredients will also occupy a significant portion of the time.

Suggest Amendments

At the opening of the hearing, American Bakers Association proposed a number of amendments to the tentative order of 1943. These included some changes in wording and a few specific technical revisions.

Among the latter were requests for including sweetened condensed partly skimmed milk as an optional milk product; restoration of nondiastatic malt sirup as an optional sweetening agent (presumed to have been omitted accidentally in the printing of the tentative order); addition of soybean flour as an optional farinaceous ingredient, up to three parts per hundred of flour; addition of milled or partly de-fatted wheat germ as an optional ingredient up to the amount naturally occurring in wheat; and deletion of potassium persulphate as an oxidizing agent. Simplification of the labeling requirements as proposed in the tentative order was also requested by the ABA spokesman, Gerard R. Williams of Scranton, Pa.

Approximately 100 people were present at the opening of the hearings. Preliminary indications were that the sweetener controversy between sucrose and dextrose interests will probably not break out, both sides expressing satisfaction with the tentative order. Other controversial questions, however, appear to be adequate to prolong the hearings throughout the winter.

Despite the original understanding to discuss bread softeners in January, American Institute of Baking witnesses brought up the subject during the discussion of ingredients in general. William Walmsley, principal of the AIB School of Baking, discussed experimental batches which had been prepared with and without three bread softeners which are now on the market. W. B. Bradley, head of the AIB Laboratory, presented factual information on bread softeners and summarized with the following statement: "I believe that the evidence which I have given demonstrates that these materials are bread softeners; they are not anti-staling agents, as they have sometimes been misrepresented to the baking industry."

Negligible cross-examination of the two witnesses took place during December, since suppliers of the bread softeners were unprepared to present their own technical data at this time and both witnesses agreed to return for cross-examination on January 25.

Baking Institute Revises Its School Curriculum

The American Institute of Baking has revised its curriculum for the School of Baking so that scientific and technical studies and experimental bake shop practices will be concentrated in the first part of the term and students may elect bread or cake bake shop projects to complete the course.

Each course has been divided into one 12-week period followed by two periods of 4 weeks each. Lectures on human relations, sanitation, and library research problems, in addition to a term paper, are included in the training program.

Three 20-week courses have been announced for 1949, beginning January 3, April 18 and August 1.

Newton Named Appert Medalist

Roy C. Newton, vice-president in charge of research, Swift & Co., Chicago, has been elected 1949 recipient of the Nicholas Appert award medal, presented annually by the Chicago section, Institute of Food Technologists. Presentation will be made by the Chicago section chairman during the national conference of the Institute at San Francisco, July 8 to 14.

(Continued)

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Our Engineering Department has a wide experience in recommending mixers for practically every mixing requirement. There is no substitute for this practical experience in supplying the most efficient equipment for each particular processing application.

The mixer shown here meets practically every requirement for stirring thin and medium viscosity liquids. It is Model H-1, ¼ H.P., operates at 1725 R. P. M. and is available with motors of all enclosures. Light in weight, it is readily portable and can be easily shifted from one tank to another. This is important where frequent cleaning or changing of the shaft is necessary. This series is widely used because of its broad application and comparatively low cost. Other standard models are available operating at 1125 R. P. M. and 400 R. P. M. Other geared models are obtainable operating at speeds from 190 R. P. M. to 800 R. P. M. Quick delivery may now be had on many models of Eastern Mixers.

MODEL H-1

Eastern has developed a mechanical rotary seal to replace the conventional stuffing box in side-entering mixers. It is applicable for non-corrosive liquids, including hydrocarbons, aqueous solutions, etc. It is particularly desirable for use with oil-sensitive substances. Maintenance trouble will be a thing of the past. Experience has shown seal will stand thousands of hours of service without maintenance or replacement of parts.

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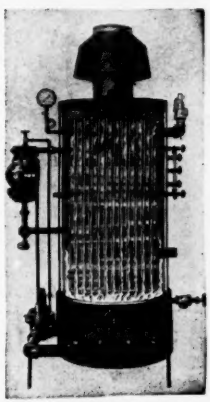
THE KANE BOILER PACKAGE

. . . it's a compact, self-contained steam source that includes: the correctly sized KANE Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal — so, send your steam problem to us for study and recommendation.



The KANE Boiler is built to A.S.M.E. specifications, in sizes to 30 H.P.

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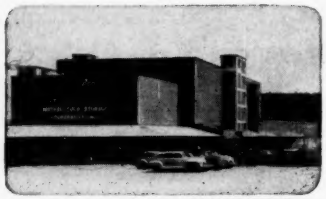

Another COMMUNITY REFRIGERATION CENTER Succeeds with Frick Refrigeration

The Mutual Cold Storage Cooperative, located between Broadway and Timberville, Va., serves the prosperous Shenandoah Valley in many ways: makes 50 tons of ice daily, stores 2,000 tons, ices trucks and railway cars, operates several ice routes; quick-freezes 50,000 pounds of poultry per day; stores 375,000 bushels of apples and 1½ million pounds of frozen foods; processes fresh foods, rents 1,285 lockers; and provides cooling services to three large cooperatives—for fruit, poultry and meats—nearby.

Modern Office Building

2,000-Ton Ice Storage

Freezer Storage at –10°

1,285 Food Lockers

For nearly 20 years the Mutual plant has used Frick Refrigeration, now has 10 Frick machines. Any community — YOUR community — could profit from a similar Refrigeration Center. Let us give you details: write

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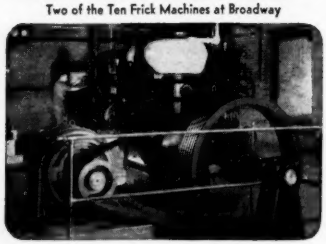
Two of the Ten Frick Machines at Broadway



DISI Collecting Rare Items For World Dairy Museum

A collection of rare rudimentary dairy utensils and equipment, owned by David Gwinn, recently-elected director of Dairy Industries Society, International, was displayed, Nov. 16-20, at the World Hobby Exposition in Philadelphia's Convention Hall. More than 50,000 people saw the items.

DISI, which is sponsoring growth of the display, has urged its members in 43 countries to search for potential museum pieces in their atties and barns in an effort to expand the collection into a dairy museum of world scope.

C-4 Replaces Famous C As Combat Ration

The famous C Ration of wartime has fallen by the wayside, a victim of the Quartermaster Corps development program in food products. The new food unit, known as the C-4 individual combat ration, consists of six different menus of three meals each packed in a container weighing 40 lb.

Among the changes in this type of ration—intended for individual feeding of men separated from the kitchens of their units—are the following:

Each menu is assembled in a separate container, so that the components will not be mixed or lost when the outer package is opened.

Cans containing meat and fruit are opened by means of a hand opener at the top of the can. It was found that the key opener previously used on the cans resulted in spilling of part of the contents. Cans containing dry items still open with keys, however.

Synthetic beverage powders used in the old C ration have been replaced by soluble coffee fortified with ascorbic acid as a vitamin supplement.

Slab-type chewing gum has been replaced with the candy-coated type.

Besides the food items, each menu contains a pack of 20 cigarettes. There are also three plastic spoons designed to be thrown away after each use, in order to avoid the danger of dysentery arising from use of utensils not properly cleaned.

The different meat items contained in the new C-4 ration are: Pork sausage patties with gravy, frankfurters with beans, chicken and vegetables, meat and beans, beef stew, beans with pork, ham and lima beans, hamburgers with gravy, corned beef hash, meat and noodles, ground meat and spaghetti, and ham and eggs with potatoes.

Each menu, besides containing three of the above meat dishes, contains one each of the following units:

B-1: Canned jam, round crackers, soluble coffee product, sugar, compressed disk of cocoa;

B-2: Cookie sandwich, round cracker, soluble coffee product, sugar, orange chocolate or lemon starch jelly disk.

B-3: Canned jam, round crackers, cookie sandwich.

Each menu also contains two of the following canned fruits: Royal Anne cherries, sliced peaches, pineapple chunks, pears, fruit cocktail, or apricots.

The accessory packet, also packed in the overall container, includes: Soluble coffee product, candy-coated chewing gum, granulated salt, water purification tablets, sugar, safety matches, folding can opener, and toilet paper.

Technical description of the components and the packaging of the new C-4 ration are contained in the CQD (Chicago Quartermaster Depot) tentative Specification No. 183E.

F&DA Organization Explained

Description of the organization, functions, and procedures of Food & Drug Administration was printed in the November 27 *Federal Register*. Information on the Washington headquarters and field organization includes a list of the sixteen inspection districts, sub-districts, and inspection stations, with street addresses in all cases. Law enforcement functions and procedures, delegations of authority, and availability of information to the public are outlined.

Millers' Convention in May

The 1949 convention of Millers' National Federation will be held at the Edgewater Beach Hotel, Chicago, May 9–11.

Wide World

Makes Capitol of Cake

This 200-lb. cake, made for the New England governors' conference, features models of the six New England capitols. Arthur Wright, A & P master baker, is seen here putting on the finishing touches.

Oil Chemists Get Reports On Advanced Research

Research projects of value to the food industry were among the reports covered at the fall meeting of the American Oil Chemists Society, at New York's Hotel Pennsylvania.

A stabilizer for animal fats that "more nearly complies with the requirements of an ideal antioxidant" as proposed by H. R. Kraybill. Shelf life of lard and freshness of products prepared with lard, stabilized by butylated hydroxyanisole, were said to be outstandingly superior.

Use of metal scavengers in commercial operation of edible oil plants were given further consideration by H. J. Dutton and his associates at the Northern Regional Research Laboratory. Citric acid and sorbitol have now been tested on a commercial scale. They have been found to improve the initial quality of soybean oil, as well as its oxidative and flavor stability during storage. The addition of citric acid at the beginning of commercial deodorization was advantageous because of the protection imparted to the oils.

Phosphatides added to the deodorizer also increased the oxidative and flavor stability of soybean oil and counteracted the prooxidant effect of added iron.

Continuous vacuum bleaching of fatty oils, in commercial operation for eight years, was described by R. R. King and F. W. Wharton. Both plant and laboratory scale studies showed that low pH earths respond better than high pH earths with respect to improved color removal in vacuum bleaching. Low pH earths were also less harmful to oil stability under vacuum bleaching.

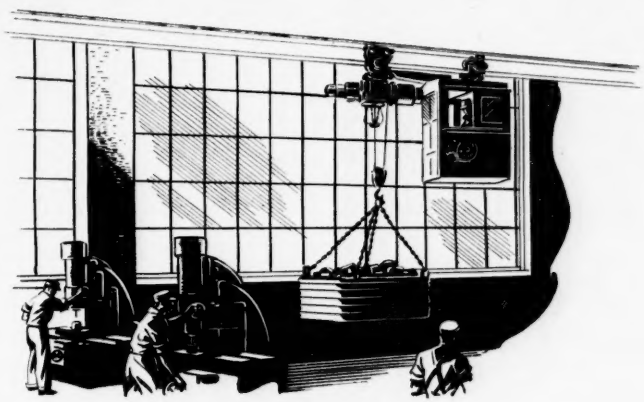
The advantages of the continuous process were shown to include greater color reduction, improved oxidation and flavor reversion characteristics, no free fatty acid rise, greater reduction in soap content, use of less absorbent, less subsequent catalyst poisoning in hydrogenation, and better flavor stability of subsequently deodorized oils.

(Continued)

Correction

Readers planning to make use of the article in December FOOD INDUSTRIES on the polarizing microscope should enter a correction in the descriptions of the photomicrographs. The article was by Russell N. Bell and was entitled "Polarizing Microscope—Quality Control Instrument". Figs. 9 and 10, on page 124, were inadvertently interchanged by the printer in the making up of the page. These are the photomicrographs of soft wheat flour and hard wheat flour.—*The Editors.*

MOVE LOADS THE FAST WAY



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Analysis of specific problems will indicate need for the work characteristics of overhead cranes, floor or cab operated hoists, or a well planned combination of these lifting tools.

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SHEPARD NILES
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Makes and sells all three lifting tools for airborne shop loads.

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Give Your Products This Combination of Merchandising Power!

PROTECTION OF PRODUCT
against moisture vapor transmission. Guard flavor, freshness and food value.

PERSUADING EYE-APPEAL
through skillful design, intelligent use of color and packaging materials.

CONSISTENT QUALITY
of packages speaks well for your product; permits high speed automatic packaging.

STRONG BRAND IDENTITY
established by coordination of design and printing. Promotes your name.

COMPETITIVE PRICES
of Oneida's bag packages make for lower packaging costs. Unit package costs lowered.

This highly desirable combination of packaging virtues is now being provided for baked goods, meats and sausage, grain and cereal products, nuts, potato chips, dehydrated and frozen foods, candy and many others.

Oneida's complete line includes bags, envelopes, printed wraps and continuous rolls of cellophane, glassine, waxed glassine, laminates, dry wax, parchment, M.G., White Wove and other papers.

Samples mailed on request.

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Americans Learn From Danes

Studying Danish food operations, a group of American farmers view a machine, at one of Denmark's cooperative plants, which stamps and sorts eggs according to weight. From left are: Robert Shinner, Herman, Neb.; John M. Kugler, Abilene, Kan.; Guy Wooster, Mapleton, Iowa; William P. Paterson, Lily, S. D.; Harold B. Willrodt, Chamberlain, S. D.; Arne Peterson, Danish Agriculture office; Clarence Ernst, O'Neill, Neb., and Lawrence Youngman, Omaha, Neb.

Segregation of fatty acids by preferential neutralization was discussed by Richard Nicholson and Marvin W. Formo. Mixed fatty acids, when neutralized by solutions of certain mixed alkalis, form mixtures of soaps. The unsaturated acids tend to react with the alkalis that form soluble soaps, while the saturated acids prefer alkalis that form insoluble soaps. Separation of the mixed fatty acids is thus accomplished by simply filtering the insoluble soaps from the soluble after such neutralization.

DISTRIBUTION

Ban on Freight Absorption Seen Hitting Candy Men

Manufacturers of candy would be adversely affected by discontinuance of freight absorption, according to Philip P. Gott, president, National Confectioners' Association. Basing his comments on a recently completed nation-wide survey of candy manufacturers, the candy spokesman also stated that very few have changed their methods of pricing as a result of the Supreme Court's cement case decision.

The candy industry survey, made in compliance with the Capehart Committee's request of last August that trade associations submit data on their industry's freight policies, indicates that the majority of candy manufacturers sell on a freight absorption basis. Bar, 5-and-10c. specialty, package, and penny goods sell on a freight absorption basis, while bulk goods is sold predominantly on an f.o.b. plant basis.

Industry problems, including sales training, expanded research membership promotion, cooperative industry advertising, and the 1949 convention, were discussed at a joint meeting of the board of directors and the Washington, Distribution, and Council-on-Candy committees, in Chicago, November 11 and 12.

Chicago was chosen for the 1949 meeting of the National Confectioners' 66th Annual Convention and 23rd Confectionery Industries Exposition, both of which will be held June 5–10 at the Stevens Hotel, Chicago.

Tin Supply Still Governs Production of Cans

The threat of mandatory government allocations of steel and other short materials—likely to be a red-hot issue for the 81st Congress—is not likely to make a dent in the can industry's output. Instead, the controlling factor on metal containers for the food processing industry will be the same as it has been for a number of years: The scarce supply of tin is now, and will continue to be, under direct government controls.

The basic factor is this: World tin production is steadily improving. And, barring a war emergency, this one fact is the strongest possible argument for (a) an end to all controls over the domestic use of tin, or (b) a steady re-

laxing of the amount of tin that may be used under the regulations allowed to continue in effect.

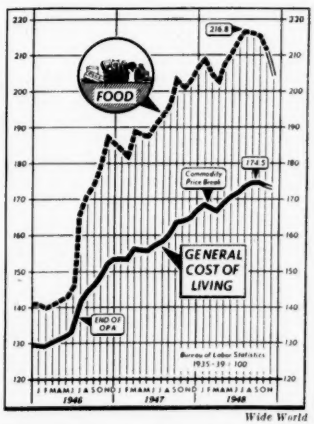
Tin controls continued by the last Congress run through June 1949. But there is every likelihood that the battle over another continuation will get under way shortly after Congress convenes—especially if the administrators of the tin control program (the Administration, in effect) try to hold back tin consumption by stacking away the increased U. S. supply into the military stockpiling program.

The figures reveal that the stockpile is being built up. The amount of tin in the stockpile, as of Jan. 1, 1948 was roughly, 20,000 tons; by the end of October, the stockpile had increased to 44,000 tons. Thus, in a period of 10 months, the stockpile of tin was more than doubled.

Decline in Fishery Exports From U. S. to Europe

Exports of U. S. fishery products to European markets have declined drastically and can be expected to remain at low ebb until means are found to improve the foreign exchange situation. Furthermore, some European countries are rapidly expanding their own fishing activities, and are even looking to the U. S. as a market for their products.

These are among the findings of a survey made by the Office of Foreign Agricultural Relations, under the Department of Agriculture's Research & Marketing Act program.



Wide World

This Makes It Official

Just in case you are hazy on some of the details, this comparison between general prices and food prices was drawn from figures gathered by the Bureau of Labor Statistics. It reflects prices on the 15th of each month. The November 1948 position is an estimate. *(Continued)*

The Answer is one of 11 reasons Why You Should Use

MM&R SPICE OILS for MODERN FLAVOR CONTROL

Two lbs. of Oil Thyme MM&R is the equivalent of 100 lbs. of dry spice. So of course you conserve storage space, facilitate handling, when you use Spice Essential Oils. In addition, bottled Spice Oils assure against the introduction of foreign bacteria or other contaminating substances.

And that's not all—highly concentrated Spice Essential Oils are more economical . . . provide uniform distribution of wholesome flavor without color disturbance.

These are just a few of the 11 reasons why more and more producers of food products are switching to Spice Essential Oils...*the MM&R brand* . . . pacesetter in the field of Spice Oils for the food industry.

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4. Less weight in shipping
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6. No loss by exposure in package while being stored
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10. Entire flavor available immediately
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- Ultimate Live Roller Bed Conveyor, Bulletin No. PB-60-1A-1
- Ultimate Double-Flex Chain Conveyor, Bulletin No. P-C18-1A-1

  Unitized Slide Bed, Bulletin No. IP-1

  Jar Cooler, Bulletin No. JC-1
- Booster Inclined Ultimate Light Duty Belt with special guide rails—Sanitary Slide Bed
- Also see our general line at the Materials Handling Show, Philadelphia, Pa. Jan. 10-14.

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The survey was made for USDA by Arthur M. Sandberg, marketing specialist of the Fish & Wildlife Service. Sandberg recently returned from two months in Western Europe, where he studied fish marketing conditions in ten countries.

As an example of the declining market, Sandberg points out that the United Kingdom, having obtained less than 1,000,000 lb. of U. S. fish products so far this year, now has cut off all purchases. By contrast, the United Kingdom used some 50,000,000 lb. of U. S. fish (mostly canned) annually prior to the war and 192,000,000 during the peak war year 1943. He reports that the United Kingdom is depending increasingly on imports of fresh fish from neighboring countries and is developing fish canning resources in some of its overseas territories.

P&MA Will Grant Licenses For More Palm, Olive Oil

The Production & Marketing Administration will grant, upon application, licenses for the importation of 5,000 metric tons of palm kernels (oil equivalent) and 1,500 metric tons of olive oil. These quantities are in addition to those announced by USDA November 10.

The 5,000 metric tons of palm kernels or palm kernel oil that may be imported are from reserves set up by the International Emergency Food Committee. Licenses will be granted for importation from any source, but no individual license will be in excess of 1,000 tons of palm kernel oil or the oil equivalent in palm kernels.

The importation of the 1,500 metric tons of olive oil now available for licensing will exhaust the reserve that may be licensed for 1948. This oil will be licensed as edible or inedible olive oil (other than sulphur-or-foots olive oil), and may be imported from any producing country. No licenses will be granted for mixtures of olive oil with other oils.

Each holder of an outstanding license for olive oil will be eligible for an increase in his license only if he has used 95 percent of the license. Applications from present license holders must show the amount of olive oil imported in 1948, the amount en route, and the amount purchased but not yet shipped.

New Farm Goals Indicate High '49 Production

Increases in summer vegetables, milk, poultry, sweet potatoes and stock sheep and lambs were included among the 1949 farm goals recently recommended by the Department of Agriculture. Somewhat smaller acreages are indicated for rice and flaxseed, though the recommended acreage is still well over the prewar average for these two crops.

Total acreage of 717,850 for 18 summer vegetables is slightly more than the 1948 harvested acreage. Commodity increases suggested: Lima beans, sweet corn and cucumbers, each 5 percent; snap beans, 7 percent; beets and watermelons, each 4 percent; and tomatoes, 2 percent. Decreases recommended: Cantaloupes and onions, each 4 percent; and celery, honeydew melons and lettuce, each 5 percent. Acreages equal to 1948 are suggested for cabbage, carrots, cauliflower, peas, green peppers and spinach.

A goal of 607,000 acres—12 percent above the 1948 harvested acreage—is proposed for sweet potatoes. With average yields, this acreage would produce 8 percent more than in 1948.

Goal advised for milk production on farms is 120,000,000,000 lb., an increase of about 3 percent over 1948 estimated production. The department suggests 700,000,000 young chickens be raised in 1949 for flock replacement. A goal of 425,000,000 hens and pullets on farms Jan. 1, 1949, had been proposed last September 13. The stock replacement goal is a 10 percent increase over the number raised in 1948, and it is intended to provide 273,000,000 pullets, to make a total of 405,000,000 potential layers on Jan. 1, 1950. The turkey production goal is likewise set at 10 percent above 1948.

Sheep and lamb goals are intended to increase numbers on farms by as much as conditions will permit. At least 30,500,000 head are sought by the end of 1949.

The most drastic cut was in flaxseed, where the suggested production of 26,700,000 bu. would be 36 percent of actual 1948 output. Rice plantings, suggested at 1,600,000 acres, would be 8 percent below the indicated acreage actually planted in 1948.

Estimate Huge Industry Losses As Coast Dock Strike Ends

After 95 days of strike-caused inactivity, West Coast ports began, on Dec. 6, to work 280 idled ships. The return of the longshoremen to their jobs was just two days short of the record set by the disruptive 1936 strike.

Exact losses were called incalculable, but it was estimated that a figure of $605,000,000 would represent total value of cargoes not shipped during this period; that lost import business amounted to about $131,000,000; and that lost longshore and seafaring wages totaled about $28,000,000.

Port losses may be judged from San Francisco's estimated value for each ship turnaround—$65,000 for freighters, $250,000 for passenger liners. Some 76 rented ships were turned back to the maritime commission by shipping lines.

Food processors who normally used water transportation to eastern markets, were forced to employ rail or part rail via gulf ports, or else warehouse their packs. In some cases bank credit had to be extended.

Hawaii was relieved when agricultural needs—soil fumigants, insecticides, fertilizers and mulch paper—again became readily available after the settlement.

The California & Hawaiian Sugar Refining Corp., San Francisco, now the sole refined outlet for Hawaiian raws, had 109,863 tons of raw sugar awaiting unloading on 16 vessels by Dec. 6. Some 1,900 employees of the firm were idled, and the payroll loss amounted to about $1,000,000.

At the strike's end, some 1,500,000 cases of canned pineapple were lying in Pacific Coast ports—1,150,000 cases in San Francisco alone.

New Grants Are Approved By Nutrition Foundation

The Nutrition Foundation, created by the food industry to develop fundamental research in the science of nutrition, made grants amounting to $185,600 at a recent meeting of its board of trustees, George A. Sloan, president, has announced.

A total of $1,810,730 in grants has now been made by the foundation to 62 universities and medical centers in the United States and Canada, Mr. Sloan said.

The solution of practical problems

Elevator Goes to Grain

Railway spans were taken in stride in the 65-mile hauling job that took this grain elevator from Hamar to Wimbledon, N. D. The job was completed in three days.

(Continued)

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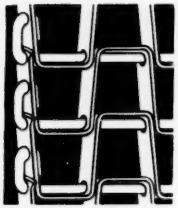

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in the food industry, in public health and in agriculture will be advanced by the basic research under way in university graduate schools, made possible by the foundation, said Charles Glen King, director. Many of the findings may have only theoretical significance, at this moment, but reliable scientific information in regard to foods has had an exciting record of becoming useful in agriculture, in medicine and in the food industry.

Schedule of Events

January

5–7—Michigan State College, annual cannery and fieldmen's conference, East Lansing, Mich.
10–14—American Society of Mechanical Engineers and Material's Handling Institute, 3rd national exposition and A.S.M.E. conference, Convention Hall, Philadelphia.
11–14—National-American Wholesale Grocers Association, Atlantic City, N. J.
14–20—National Canners Association, 42nd annual convention, Convention Hall, Atlantic City, N. J.
15–19—Canning Industry and Supplies Association, annual exhibit, Convention Hall, Atlantic City, N. J.
24–28—American Society of Heating and Ventilating Engineers, 9th international exposition, International Amphitheatre, Chicago.
26–27—U. S. Public Health Service, symposium on recent research in food and milk sanitation, Department of Commerce Auditorium, Washington, D. C.
27–28—National Dairy Council, 34th annual meeting—winter conference, Robert E. Lee Hotel, Winston-Salem, N. C.
28—Pennsylvania State College, annual ice cream short course conference, Nittany Lion Inn, State College, Pa.

February

6–8—Institute of American Poultry Industries, fact finding conference, Municipal Auditorium, Kansas City, Mo.
7–10—American Warehousemen's Association, 58th annual meeting, Fairmont and Mark Hopkins Hotels, San Francisco.
7–18—Oregon State College, 28th annual Canners' and Frozen Food Packers' School, Food Technology Dept., Corvallis, Ore.
15–17—Michigan State College, technical school for pickle and kraut packers, East Lansing, Mich.

March

6–10—National Preservers Association, annual convention, Stevens Hotel, Chicago.
7–10—National Association of Frozen Food Producers, annual convention and all industry exposition, Stevens Hotel, Chicago.
7–10—American Society of Bakery Engineers, silver anniversary meeting, Edgewater Beach Hotel, Chicago.
20–24—National Food Brokers Assoc., 44th annual convention, Chicago.

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Changes in Food Supplies

Materials

HATCHERY production reached a total of 45,660,000 chicks in October, a 17 percent increase over October 1947 and 22 percent over the 1942-1946 average for the month. Production for the first ten months, however, was 7 percent under the same period of the year previous.

CUCUMBERS for pickles in 1948 totaled 5 percent less than the 1947 output. Preliminary estimates put 1948 production at 9,711,000 bu., compared with 10,223,000 bu. in 1947.

Stocks and Storage

FROZEN FISH AND SHELLFISH held on November 1 totaled 146,505,446 lb., approximately 6,500,000 lb. more than was held on October 1, and 5 percent more than the holdings reported Nov. 1, 1947. The December 1 holdings were estimated at about 150,000,000 lb.

FREEZER OCCUPANCY gained 2 points during October and stood at 73 percent on November 1. Despite this seasonal gain, however, occupancy was still 10 points below the same date the year before.

COOLER OCCUPANCY on November 1 was 12 points below the same date in 1947, remaining at 64 percent, the same as the occupancy reported on October 1.

Production

CREAMERY BUTTER production in October, estimated at 92,820,000 lb., was off only 4 percent in the September-October seasonal decline, compared with a drop of 9 percent last year, and a five-year average decrease of 11 percent. Output was 1 percent over October 1947, but 11 percent below the five-year October average.

ICE CREAM production was estimated at 35,180,000 gal. in October, a drop of 35 percent from September, as against a 22 percent decrease last year and the five-year September-October decline of only 17 percent. Production was 27 percent below October 1947 and is 15 percent under the five-year average for the month.

AMERICAN CHEESE produced in October is estimated at 63,640,000 lb., 10 percent more than the five-year average for the month. Compared with October 1947, output was up 1 percent. The seasonal decline was only 11 percent this year, compared with 12 percent last year and a five-year average September-October decline of approximately 15 percent.

DRY SKIM MILK production came to 1,060,000 lb. in October, a contraseasonal gain of 5 percent over September and 13 percent greater than in October of last year. Output of dry whole milk during October was 11,515,000 lb., 16 percent less than in September and 23 percent less than a year earlier.

EVAPORATED MILK production at 226,250,000 lb. during October, was the third highest for the month on record. Condensed milk production, on the other hand, showed a decline of 56 percent from October 1947, output being only 8,600,000 lb.

POULTRY canned or used in canning during October was up 54 percent over October 1947. Output totaled 14,443,000 lb., compared with 9,386,000 lb. a year ago. During the first ten months of 1948, poultry so used was up 76 percent over the same 1947 period.

CANNED PEACHES packed in 1948 totaled 17,569,000 cases, basis 2½'s, according to the National Canners Association. This was about 8 percent below the 1947 pack of 19,107,000 cases.

Indexes

THE COMMODITY INDEX for food compiled by the New York Journal of Commerce, was down to 183.1 for the week ending December 18. This compares with 184.1 for the previous week, 192.0 for November, and 207.2 for December, 1947.

BUSINESS WEEK'S index of business was up to 199.4 for the week ending December 11, compared with 199.1 the previous week, 197.4 a month earlier, and 197.0 a year ago.

CONSTRUCTION

	Pending (thousands)	Total Awarded— Dec. (thousands)	Total Awarded— 1948 (thousands)
Bakery	$145	.....	$10,012
Beverages	586	$375	18,960
Canning and Preserving	550	85	485
Cold Storage	75	185	1,889
Confectionery	.....	.....	2,335
Grain Mill Products	2,570	196	11,620
Ice, Manufactured	200	.....	70
Meats and Meat Products	1,126	1,440	4,007
Milk Products	985	68	6,958
Miscellaneous	518	70	21,763
	$6,755	$2,419	$78,099

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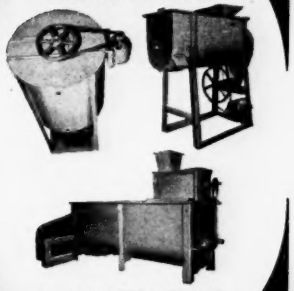

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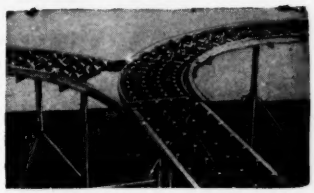

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What Washington Thinks

By R. S. McBride, Washington, D. C.

LAW MAKING

Congress is currently confronted with many new law-making jobs. For the next few months there will be a great deal of talk about the "mandate" of the voters. But the fact is that many legislators represent a majority of only a few percent more voters than their defeated opponents. As problems affecting food technology arise in Congress, it will be appropriate and necessary that the legislators be reminded of minority interest. This will be particularly important when laws are proposed of a strictly New Deal character. It is expected that spokesmen of the food business will necessarily be quite busy in Washington this spring in order to be sure that constructive legislation does not get out of hand and become dangerously restrictive on legitimate business.

TWO KINDS OF RED

Industry is trying to get rid of two kinds of reds. It dislikes the two about equally. One is the red ink at the bottom of the balance sheet. The other is the Red on the payroll. Management can now count on most labor leadership for cooperation in removal of the violent political Reds. It is not evident that labor leaders seeking increased wages are as much concerned about the balance sheet color.

THE FARMER'S SHARE

The farmer's share of the consumer dollar has always been a little less than 50c., until recent years. It was barely 40c. in the five-year period just before the war. But currently the farmer gets something more than 54c., which was his "cut" during 1947. In the case of some products like meat, the farmer gets an even higher proportion, generally about 71c.

DEFINING IMPROVEMENT

The nutritionists of the country are speaking to the food business again through Food & Nutrition Board. This outstanding agency early this winter is undertaking to apply an important principle of rating to modified standards that involve the addition of chemicals to foods. The purpose is to insure that when chemicals are so added there should be not only assurance against toxicity but also that "the addition should improve rather than lessen the nutrition quality of the food product." Implication is that previously food technology has been willing to accept chemicals for preservative purposes and for other convenience advantage without regard to the effect on nutritional value. It is not likely that such criticism would be generally accepted by food men as fair. But the objective now sought probably will be.

NEW RATION C-4

The army has announced "Combat C-4" as a superior field ration intended to supply balanced meals with flavor variety. Each day's meals provide 3,800 calories with adequate carbohydrate, fat, protein, and vitamin content for the soldier engaged in heavy field duty. Numerous units of the food business are likely to be called on soon to make trial production runs on the components and the complete units. Small scale output has been achieved, permitting brief troop tests. But more educational orders are being talked about to be sure that big-scale manufacture would be favorable on short notice in an emergency.

POTATO PROBLEMS

Protecting potato growers against loss cost Uncle Sam (that means us tax-payers) many millions of dollars last year. The spotlight of public criticism was turned on this mess brilliantly. And the public did not like what it saw. Official Washington was, and is, well aware of this fact. This year's potato price support is much more carefully safe-guarded, but even so there will be tax-payer burdens of some tens of millions of dollars, perhaps more. The important fact is that price manipulation for the benefit of a particular class invariably gets out of hand and becomes conspicuous enough to make price manipulation politically inexpedient. It looks as though Congress, in its review of price controls, will respond only to this kind of argument.

NEW PRICE INDEX

A new weekly index of wholesale prices is now being used by Bureau of Labor Statistics. The commodities on which the index is based are weighted according to their relative importance in the cost of living. This gives to the group of food commodities a weighting of 22.09 percentage of the total—the largest weighting of any group. Farm products, which come next, get a weighting of 21.37.

By comparison, the importance of house furnishings and building materials seems negligible, because these are only 2 percent and 6 percent, respectively. All this shows why the housewife is more than usually interested when food prices move up.

RODENT CONTROL

Tremendous areas of the U. S. require work to control rodent pests. Last year Uncle Sam spread about 2,800,000 lb. of poison bait over 11,800,000 acres. Huge additional pest control efforts were made in non-rural areas and in industry. But despite this huge effort, the destruction of food raw materials last year by rodents alone is estimated in the tens of millions of dollars. Constant effort is being made by the Fish & Wildlife Service to secure more extensive industrial cooperation. F&WS is far from satisfied that private funds spent in this effort were nearly three times the spending of federal money. Since each dollar so spent by industry is likely to prevent several dollars loss, there should be more rodent control effort.

PARITY CONTINUES

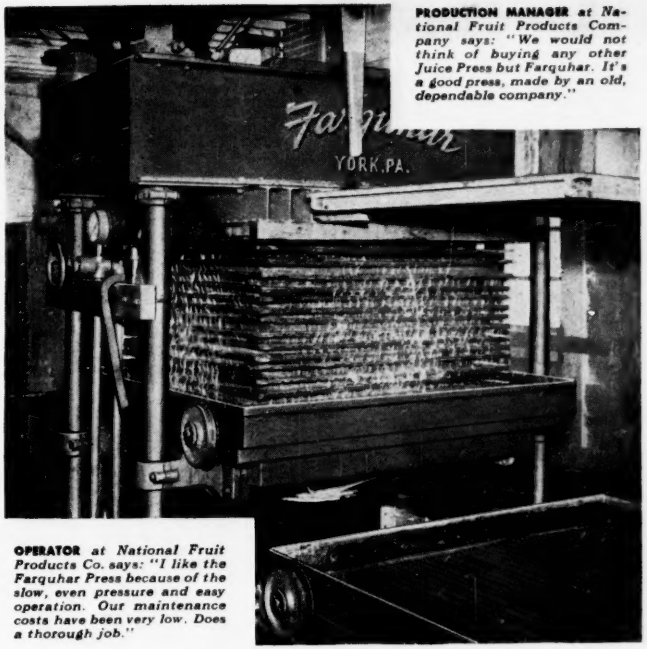
Congress passed a new farm price support law last year. The new Congress is likely to pass still another law this year. But official handling of the laws continues almost as though the old parity price rules still applied in full detail. Fact that this has not yet brought about a legal complication is only because the parity ratio is still high enough so that farmers do not get price support yet on most commodities. Truth is that prices of food raw materials from the farm seem destined to bounce off the parity price level for some time to come.

MARGARINE TAX CUT

Margarine spokesmen in Washington are delighted that the National Grange has decided to support legislation for eliminating the tax on colored margarine. This year it may be enough to put over the cut in taxes, which last year passed the House but failed in the Senate. However, no one expects an easy victory, since the butter lobby is still potent and active.

EXPORTS AIDED

Uncle Sam continues to encourage exports of both fresh and processed citrus fruit to European countries by contributing a quarter of the gross sales price under certain conditions. Comparable aid is given also to certain exports of dried fruit, especially surplus prunes and raisins for ECA countries.



PRODUCTION MANAGER *at National Fruit Products Company says: "We would not think of buying any other Juice Press but Farquhar. It's a good press, made by an old, dependable company."*

OPERATOR *at National Fruit Products Co. says: "I like the Farquhar Press because of the slow, even pressure and easy operation. Our maintenance costs have been very low. Does a thorough job."*

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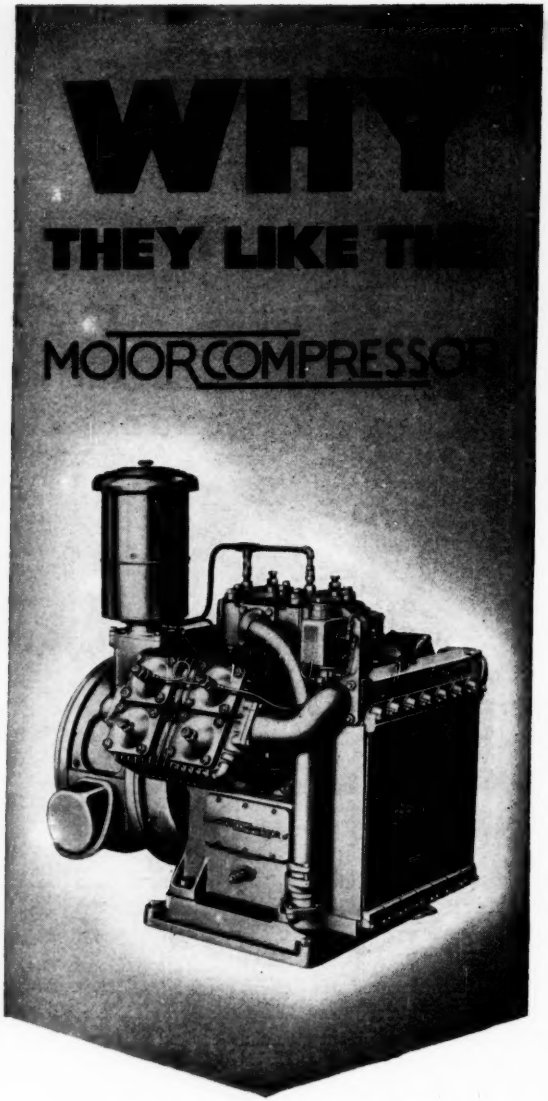
Farquhar **FOOD PROCESSING MACHINERY**

JUICE PRESSES • SPRAY COOLERS • CLEANING UNITS
TRIMMING TABLES • PASTEURIZER-COOLERS • CONVEYORS

WHY THEY LIKE THE MOTORCOMPRESSOR



WHAT IS A MOTORCOMPRESSOR?

An Ingersoll-Rand two-stage, air-cooled compressor with a built-in motor . . . made in five sizes from 25 to 75-hp

WHAT IS IT FOR?

Compressing air to pressures up to 125 psi. It is ideal for main air supply . . . or for supplementing the capacity of larger compressors during peak loads . . . or for locations remote from main compressed-air lines . . . or wherever the advantages of air-cooling are important.

WHO LIKES IT?

Maintenance men, engineers, owners, and workers who rely upon a steady supply of Air Power . . . in mills, factories, mines, railroad yards, foundries, construction jobs, and aboard ship.

WHY THEY LIKE IT?

- Air-cooling eliminates the cost of water, water piping, and the danger of freezing.
- Two-stage compression saves power.
- Channel Valves are durable, efficient, stay tight.
- No need for special foundation.
- Compact and lightweight . . . easy to install or relocate.
- Timken tapered-roller main bearings.
- Constant-level lubrication is simple and trouble-free.
- Dual Control provides efficient regulation under any kind of load . . . a selector switch permits use of either constant-speed or automatic-start-and-stop control.
- Dependable in operation . . . easy to service and maintain.
- Built by Ingersoll-Rand . . . by the men who know Air Power, and who build both the compressors that generate it and the tools that use it.

AIR POWER . . . The Key to Lower Production Costs

1-980

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

COMPRESSORS • AIR TOOLS • CONDENSERS • CENTRIFUGAL PUMPS • ROCK DRILLS • OIL ENGINES

Men, Jobs, Companies

CARLTON A. FRIDAY, president and general manager of Friday Canning Co., New Richmond, Wis., was elected president of Wisconsin Canners Association at the group's 44th annual meeting held in Milwaukee. He succeeds R. Winters of Larson Co., Green Bay.

COL. ROHLAND A. ISKER, wartime commanding officer of QF&CI, Chicago, is now secretary of the Associates, Food & Container Institute, a non-profit organization made up of 200 firms cooperating with the Armed Forces to effect supply of better food.

DR. JULES D. PORSCHE, assistant director of research and development at Armour & Company, Chicago, has been awarded Army-Navy Certificate of Appreciation in recognition of valuable wartime services in the field of making crystalline human albumin.

Industry

AMERICAN CAN CO. and also CONTINENTAL CAN CO. made announcement, at Wisconsin Canners Association meeting, of plans to build manufacturing plants in Milwaukee area. These plants will be the first for each firm in the state.

AUSTIN PACKING CO., maker of packaged bakery products distributed in 28 eastern states, has begun construction of a new plant in Baltimore. Old plant will be razed to make way for highway construction.

BANFF FOOD PRODUCTS, INC., has been established in Alamo, Tex., to engage in manufacture of citrus marmalades and jellies.

BORDEN CO. has announced purchase of business and assets of Best Ice Cream Co., Syracuse, N. Y., and Princesse Ice Cream Corp., Jacksonville, Fla. Firm also reports construction of a new powdered milk plant at Kemptville, Ontario, Canada.

BROWN & SCOTT PACKING CO. has opened a new $500,000 plant in Wilmington, Del.

CALIFORNIA PACKING CORP. has begun construction of a new canning plant at Mendota, Ill. Completion date is scheduled to be in time for '49 packing season.

DURKEE FAMOUS FOODS, division of Glidden Co., reports start of construction of a margarine and mayonnaise plant at Macon, Ga. Cost will approximate $2,500,000.

FLORIDA CITRUS COMMISSION has approved a budget of $13,000,000 for advertising the current season's output of canned and fresh fruits.

HAWAIIAN PINEAPPLE CO. announces that its new cannery at Dolmex, Vera Cruz, Mexico, is expected to be completed in time to process the '49 Mexican pineapple crop.

KRAFT CHEESE CO. is reported to be making plans for taking a six year lease on a new building being constructed in Memphis, Tenn. Completion date is set for April of this year.

MCCARTHY PACKING CO. is name of a new meat packing firm recently established in Malone, N. Y.

NATIONAL BISCUIT CO. is reported to have purchased the wholesale baking business of Bart's Bakery, Savannah, Ga.

PERKINS PRODUCTS CO., manufacturer of soft drink powders, will erect a one-story plant in Chicago. Estimated cost is $1,000,000.

RICHHEIMER COFFEE CO., Chicago, is constructing a one-story coffee roasting plant and office building. The structure, to cost over $250,000, will be 21,000 sq. ft. in area.

SEABROOK FARMS CO. is the name which will now be employed by Deerfield Packing Corp., quick-frozen food company of Bridgeton, N. J., organized in 1933 by C. F. Seabrook. Proposed and passed by the Deerfield directors and approved by stockholders, the change is to give closer identification with the brand of product.

SHAW PACKING CO., INC., is the name of a new meat packing plant opened recently in Tyler, Tex.

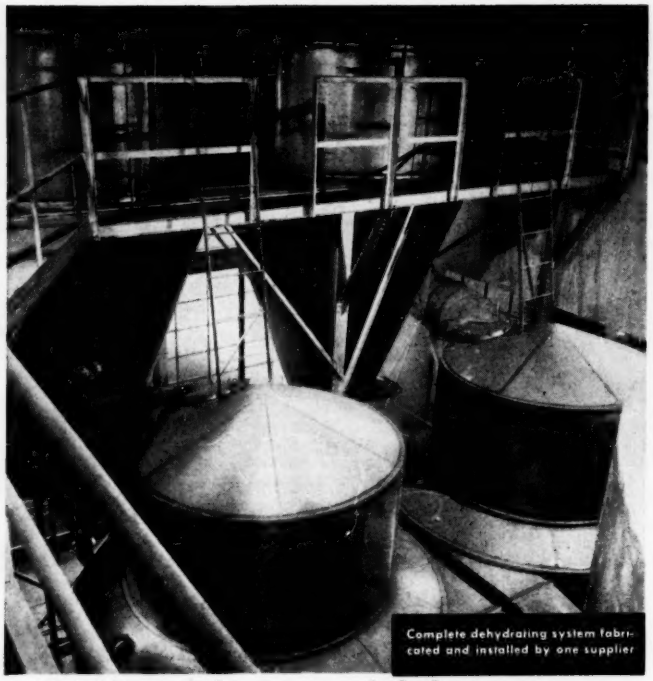
SIERRA MEAT CO. has begun operation in its new meat-packing plant at Fresno, Calif.

A. B. STALEY MANUFACTURING CO., processor of corn and soybeans, has opened a new $2,500,000 plant at Decatur, Ill., to produce a pure form of monosodium glutamate, which will be marketed under the tradename "Zest".

SOUTHWEST MARGARINE CO. has opened a new plant at Dallas, Tex. Product is known as Admiration brand margarine.

FIRE LOSSES: The packaging plant of Morton Salt Co. refinery in Grand Saline, Tex., was recently wrecked by

(Continued)


Complete dehydrating system fabricated and installed by one supplier

DAY stainless steel fabricating meets exacting specifications

A single dehydrating plant which could be used for whole milk, skim milk, powdered eggs and ice cream was required by Delaware County Farmers' Cooperative Milk Company, Delhi, New York. Naturally, the equipment had to resist corrosion and be sanitary. But above all, because of its many uses, it had to be *easy to clean.*

Corrosion-resistant stainless steel was recommended by engineer John I. Ormond of East Grand Rapids, Mich., to meet high sanitary requirements. Ormond designed the complete installation in cooperation with **DAY** Company engineers. The equipment consisted of 5 **DAY** DUAL-CLONES, spray chamber with turbulator, and all necessary duct work and structural steel.

Due to Ormond's previous business relations with The **DAY** Company, he had complete confidence in their ability to custom-build the entire installation. Expert **DAY** mechanics and welding technicians fabricated this equipment from stainless steel. To insure sanitary conditions, they polished *smooth* all inside surfaces in contact with food.

Today, the modern dehydrating plant of Delaware County Farmers' Cooperative stands as another example of **DAY** Company's ability to fabricate equipment of stainless steel for the food industry.

DAY Company fabricates equipment of stainless steel up to 10 gauge for any branch of the food industry. Capable DAY engineers cooperate with you or your engineer to work out construction drawings and shop details. Their expert technicians custom-build your equipment to specifications. DAY Company's 67 years of service to industry assure quality fabricating at minimum costs.

*For information on stainless steel fabrication for your plant, write-to-***DAY!**

DAY SINCE 1881

The **DAY** *Company*

817 3rd Avenue N. E., Minneapolis 13, Minn.

IN CANADA: P. O. Box 70D, Ft. William, Ont.

Representatives in principal cities

CLIFFORD F. EVERS, recently appointed head of U. S. Fishery Technological Laboratory, College Park, Md., was formerly technical director of National Association of Frozen Food Packers. He succeeds Dr. L. A. Sandholzer who died last June.

explosion and fire which caused an estimated $250,000 in damages. . . The rice mill of Northern Rice Milling Co., Gibson Switch, Ark., was recently destroyed with an estimated loss of $400,000. . . The Charles L. Noble vinegar works of Clyde, N. Y., recently sustained a $30,000 fire loss.

Personnel

ALBERT F. FORD, formerly assistant to the production superintendent at New England Confectionery Co., Cambridge, Mass., has been promoted to the post of superintendent.

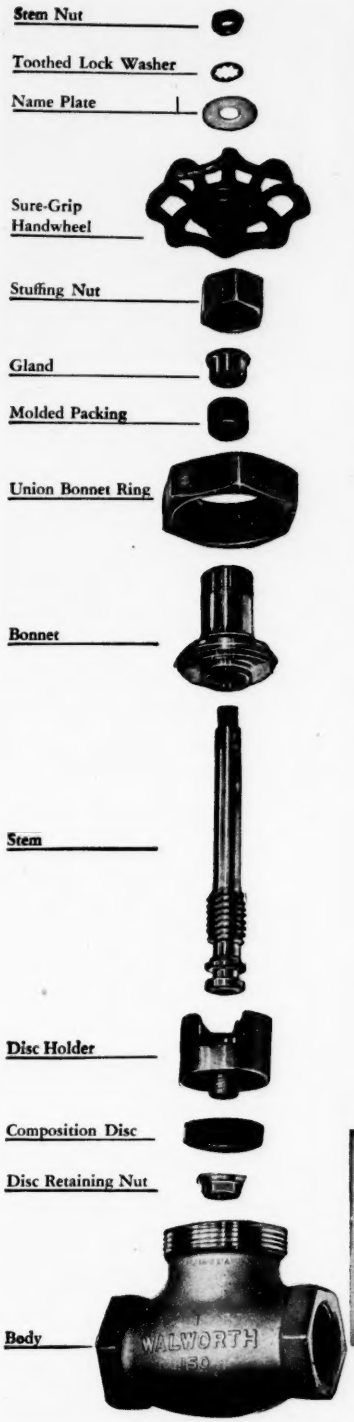
DR. KENNETH C. D. HICKMAN, inventor of the modern molecular still used for refining heat-sensitive oils (such as those containing vitamins), is now carrying out research in the field of high-vacuum engineering at Arthur D. Little, Inc., Cambridge, Mass.

W. A. JOHNSON, of the Dr. Pepper Bottling Co. in Tampa, has been elected president of the Florida Bottlers of Carbonated Beverages. George C. Buchanan, of Royal Crown Bottling Co. in Jacksonville, was elected vice-president, and H. L. Robinson, of the Pensacola Bottling Co., became secretary-treasurer.

PETER L. RACK has been elected by the board of directors of Kurtz Brothers Corp., Bridgeport, Pa., to the position of executive vice-president & general manager.

ALFRED R. NIELSEN, of West Palm Beach, Fla., has been elected president of the Southern Association of Ice

(Continued)



TO MAKE A GOOD VALVE BETTER

Walworth has redesigned and improved its No. 95 Quality Bronze Globe Valve.

150 pounds working steam pressure at 500F

300 pounds cold water, oil, or gas.

Can be repacked under pressure when fully opened.

The Walworth No. 95 Bronze Globe Valve has always been tops with piping men because they liked these features: Renewable composition disc; lock-on, slip-off disc holder; union bonnet construction; deep stuffing box; tough bronze body made of Composition M (ASTM B61).

Now Walworth has added these improvements: (1) New cylindrical disc holder that accurately guides the disc to the seat, regardless of the position in which you install the valve. (2) Newly designed, air-cooled, sure-grip handwheel that you can grab and turn, even when wearing greasy work gloves. It has a tapered square hole sized to gage to fit snugly on the finished square of the stem. (3) Toothed lock-washer to prevent the stem nut from becoming loose. (4) All parts have been redesigned to give maximum service and strength.

Walworth Quality Bronze Valves are available in Globe (No. 95), Angle (No. 96), or Check (No. 97) types and in sizes from ¼ to 3 inches (check valves ¼ to 2 inches). Ask your Walworth distributor to show you the improved Walworth No. 95 Bronze Valve, or write for further details.

WALWORTH

valves and fittings

60 EAST 42nd ST., NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Awarded by The Franklin Institute for Discovery, Invention or Development in Physical Science

RESEARCH REPORT

NUMBER ONE

ON THE PROGRESS OF MAKING DRY SEPARATIONS BY SPECIFIC GRAVITY THROUGH AIR-FLOTATION

COMPILED FROM SIXTY-ONE YEARS OF SPECIALIZED EXPERIENCE IN SEPARATIONS

OATS FROM GROATS: *Reproduced above are unretouched photographs of product samples taken during pre-delivery tests of a Sutton, Steele, and Steele Specific Gravity Separator. In this particular case the customer's problem was the separation of oats from groats (the edible parts of oat kernels).*

FOOD FOR THOUGHT

The example "oats from groats" is only one of hundreds of other types and classes of products destined for human consumption which are being separated from contaminations and up-graded to best sellers by specific gravity through air-flotation.

In a nutshell, the famous S S & S Process consists of "floating" a product, in bulk form, on a cushion of air over an oscillating deck. Here the actions of specific gravity, plus vibration of the deck, separate and classify each particle of material according to individual density.

Every minute of every food processing day you'll find S S & S Specific Gravity Separators being used where the problem is one of *cleaning, separating,* and *grading,* and S S & S Air-Float Stoners for two-way separations of heavier contaminations from the lighter end product.

WHEN SEEING IS NOT NECESSARILY "BELIEVING"

Here's how one of our customers used a Specific Gravity Separator to outwit, of all things, *a worm!*

When insects attack Garbanzos (or chick peas) the worm eats part of the pea, makes a hole, and "pulls the hole in after him" by depositing a film across the doorway. This makes his damage virtually impossible to detect with the naked eye.

However, an S S & S Specific Gravity Separator is being used very effectively to separate lighter worm eaten Garbanzos from the heavier useable product by specific gravity through air-flotation.

FACTS ABOUT THE WETHERILL MEDAL

The John Price Wetherill Medal (see upper left) was first awarded in 1926. Mr. Frank Twyman received it for his work on the *Interferometer,* and the Wagner Electric Corp., for the *Alternating Current Motor.* Sutton, Steele, and Steele, Inc. received the award in 1931 for development of a *Method and Apparatus for Dry Cleaning Coal.*

LITERATURE AVAILABLE

Tell us about your separating problem and we will forward bulletins which describe in detail how the famous S S & S Process can be applied successfully to your particular needs. Address inquiries to:

DEPARTMENT A

SUTTON, STEELE & STEELE, INC.
1031 SOUTH HASKELL AVENUE
DALLAS, TEXAS, U.S.A.

SUTTON, STEELE & STEELE, INC.

Dallas, Chicago, Des Moines, Minneapolis, New York City, Pittsburgh, San Francisco, Columbus, Ga., Jackson, Mich.
Foreign: Winnipeg, Canada; San Paulo, Brazil; London, England.

DR. WILLIAM W. PIGMAN, elected chairman of Div. of Sugar Chemistry & Technology of ACS, is a leader in research on wood, sugars and starches. A member of Institute of Paper Chemistry, he had been on the chemical staffs of National Bureau of Standards and Corn Products Refining Co.

Cream Manufacturers. Bryan Blalock of Marshall, Tex., was elected vice-president, and David P. Adams of Nashville, Tenn., secretary-treasurer.

R. W. REGENSBURGER has been named vice-president of Swift & Co. and will have jurisdiction of the firm's construction activities. He succeeds A. F. Hunt, who is retiring from active business because of poor health.

R. A. ROBERTSON, formerly vice-president and secretary-treasurer for Geo. Weston, Ltd., with headquarters in Toronto, has been elected to the presidency of the firm. He succeeds F. W. St. Lawrence, who becomes assistant chairman of board.

FRED P. SLIVON has been elected a director of Libby, McNeill & Libby to succeed William H. Long, retired.

C. C. SPEARS has been named president of the Coast Oyster Co., which has opened offices at the U. S. National Bank Bldg., Portland, Ore.

DR. M. J. THOMAS, research chemist with A. E. Staley Manufacturing Co., Decatur, Ill., has been appointed assistant to W. F. Allen, manager of the development division. In addition, Dr. A. W. Turner has recently joined the firm's laboratory staff and is working in the fermentation division.

J. T. WISE, formerly employed as a chemist with Campbell Soup Co., central division, Chicago, is now a chemist for Blue Seal Food Products Co.

(Continued)

AS NEAR AS YOUR TELEPHONE

A new V-Belt service by Dayton, to save you time and money three ways:

1. "Drive Proved" V-Belts—the right belt for your particular drive. For Dayton has made more than 100 million V-Belts. They have been "Drive Proved" in every kind of industry, under every possible operating condition of heat, cold, dirt, dust and oil. They have proved their ability to save space; provide positive power; start and stop smoothly; run quietly, without vibration and last longer than any ordinary belt.

2. As Near as Your Telephone. There is a Dayton V-Belt Distributor near you. He is equipped with the specialized knowledge to recommend the right drive for you. You'll find him listed in the classified section of your telephone directory or his representative is now calling at your plant.

3. Instant Maintenance Service from Local Stocks. Your Dayton Distributor maintains complete stocks of Dayton "Drive Proved" V-Belts and pulleys. He is prepared to give you instant service for existing or future drives, and to provide you with an immediate source of mill supplies.

Put this new service to work in your plant now. Equip your drives with Dayton "Drive Proved" V-Belts and be sure you are getting the maximum in drive performance and service. Call your Dayton V-Belt Distributor today. *The Dayton Rubber Company, Dayton, Ohio.*

ONLY Dayton V-Belts are "DRIVE PROVED" for the Job!

Dayton Thorobred—for normal and heavy duty drives.
Dayton FHP—for small machines and appliances.
Dayton Cog—for shortest centers, smallest pulleys.
Dayton Steel Cable—for extreme loads and speeds.

ALL STOCKED BY YOUR LOCAL DAYTON V-BELT DISTRIBUTOR

Dayton Rubber

Corrosion-proof Floors

for DAIRIES, SUGAR REFINERIES, FOOD KITCHENS, BOTTLING WORKS . . . and other FOOD Plants!

FLOORS of acid-proof brick, joined with Atlas ALKOR* and having Atlastic water-proof layer over the concrete base, are absolutely proof against, not merely "*resistant to*" food and beverage acid syrups . . . and also against alkalis, cleaning solutions, fats and oils, blood and animal wastes and live steam used in sterilizing.

Atlas corrosion-proof floors serve also in breweries, wineries, distilleries, beverage works, meat and fish packing plants, bakeries, etc. Built tight and dense, Atlas floors cannot harbor bacteria or foster odors. They are super resistant to wear and mechanical shock and with them, "down time" due to corrosion disappears.

Atlas engineers will be glad to make a study of your flooring problem and to submit recommendations, plans and estimates — all without obligation. Call our nearest office. Write us at Mertztown for Technical Bulletin F1-1.

Atlas floor in well known Eastern Bakery. Red acid-proof brick, joined with Atlas ALKOR*. This floor will ask no "time out" for maintenance.

This Atlas floor of tile, joined with ALKOR*, serves in prominent New York brewery. Constant dripping of beverage wastes do not harm it and it will stand up under severe mechanical punishment.

*ALKOR is the original acid- and alkali-proof cement—Proof against alkalis of all concentrations.

THE Atlas Mineral Products Company of Penna.

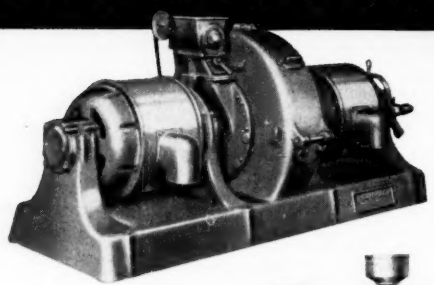
THE ATLAS MINERAL PRODUCTS CO. OF TEXAS INC., Box 252, Houston 1, Tex.

MERTZTOWN PENNSYLVANIA

*BERKELEY 2, Calif., 605 Addison St.
*DALLAS 5, Tex., 3921 Purdue St.
*DENVER 7, Colo., 1921 Blake St.
*HONOLULU 7, Hawaii, U. S. A.
*OMAHA, Neb., 423 South 38th Ave.
*LOS ANGELES 12, Cal., 372 S. Central Ave.
*SEATTLE 4, Wash., 1252 First Avenue, S.
*Stock carried at these points
*ATLANTA 3, Ga., 452 Spring St., N. W.
*CHICAGO 1, Ill., 333 No. Michigan Ave.
*DETROIT 2, Mich., 2970 W. Grand Blvd.
NEW YORK 16, N. Y., 280 Madison Ave.
PITTSBURGH 27, Pa., 4921 Plymouth Rd.
PHILADELPHIA, Pa., 355 Fairview Rd. Springfield, Pa.
ST. LOUIS 5, Mo., 7603 Forsythe Blvd.

IN CANADA: Atlas Products are manufactured by H. L. BLACHFORD, Limited, 977 Aqueduct Street, Montreal 3, P. Q., 86 Bloor St. W., Toronto, Ont.

WHETHER YOU NEED A GIANT OR A MIDGET...



....it's in the Bauer LINE

SHOWN HERE in approximately relative sizes are two Bauer attrition mills. The big one is a 2-motor double-disc giant weighing nearly ten tons. The small one is a comparative midget—the 8" disc No. 148-1-B Attrition Mill weighing 300 lbs. You'll find what you need in Bauer grinding equipment. Refer your problems to us.

THE BAUER BROS. CO., SPRINGFIELD, OHIO

Associated Industries

AMERICAN SOCIETY of BAKERY ENGINEERS has named Patrick J. Colombo as assistant to Secretary Victor E. Marx.

E. W. BLISS CO., Detroit, has elected William F. B. Henderson executive vice-president and a member of the board of directors.

CONTINENTAL CAN CO. announces appointment of J. E. Niederhauser to the newly created post of vice-president in charge of industrial relations.

MASTERCRAFT METALS, Dayton, Ky., announces that plans have been drawn and a site purchased for a new $100,000 plant at Bellevue, Ky.

MATHIESON CHEMICAL CORP. has announced that S. L. Nevins will be general manager of the newly formed ammonia dept.

PERSONNEL INSTITUTE, INC., has announced the appointment of Dr. Lawrence Edwin Abt to the position of Director of Research.

PENNSYLVANIA SALT MANUFACTURING CO. has named Hyman Iserson and Maurice E. Miville as research chemists at the firm's Whitemarsh Research Laboratories.

SYLVANIA DIVISION, AMERICAN VISCOSE CORP., announces that Thomas H. Derby has joined its market development dept.

TEXTILE BAG MANUFACTURERS ASSN. has appointed S. W. Sullivan as its director of promotion.

Deaths

JOHN C. BROWN, 73, chief chemist of American Butter Institute, Chicago, Nov. 22, from a heart attack.

RALPH A. BURRIS, 61, manager of Beatrice Foods Co. plant at Vincennes, Ind., Nov. 5, at his home after a brief illness.

HENRY W. CHAVIS, 55, owner of Ames Canning Co., Ames, Iowa, Nov. 8, at his home from gunshot wounds.

SCOTT A. HOLMAN, 62, executive vice-president and director, Libby, McNeill & Libby, Chicago, Nov. 28, in a taxicab accident.

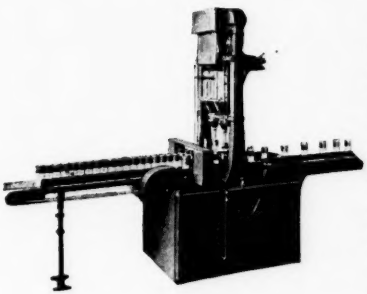
FREDERICK H. MASSMAN, 73, vice-president and sales manager Peter Fox Brewing Co., Chicago, and formerly president National Tea Co., Nov. 3, in Chicago.

US

Manufactures Machines For

NET WEIGHING
GROSS WEIGHING
PACKING
PACKAGE FORMING & FILLING
CARTONING
CARTON SEALING
CARTON LINING
CARTON WRAPPING
PAPER BOX FORMING
PAPER BOX COLLAPSING

. . . they chose US



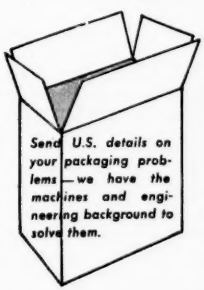
The NEW Model JK
Fully Automatic Volume Filler Weigher or Packer

The packer of the spices illustrated above economically solved his filling problem with *U S.* Using the new fully automatic, twin station Model JK Packer, you too can achieve dollar saving results. And operators will praise its clean, efficient operation and its many new features.

The Model JK fills with closest accuracy up to 60 containers per minute on all kinds of powdered and granular materials. Normally the operation of this automatic machine is to fill by packing under controlled pressure; for those materials that require settling rather than packing, the new vibrating filling platform is furnished.

An efficient dust collector hood at the filling stations collects any escaping particles, keeps the machine and surrounding air clean and free of annoying dustiness. This, combined with the new shut-off gates which eliminate the drip at the augers, makes the filling operation absolutely clean.

Combine the foregoing with other new features designed to provide efficiency in performance and convenience for the operator and you have a machine that is the last word in modern high-speed powder filling.



Send U.S. details on your packaging problems—we have the machines and engineering background to solve them.

US Automatic Box Machinery Co. Inc.

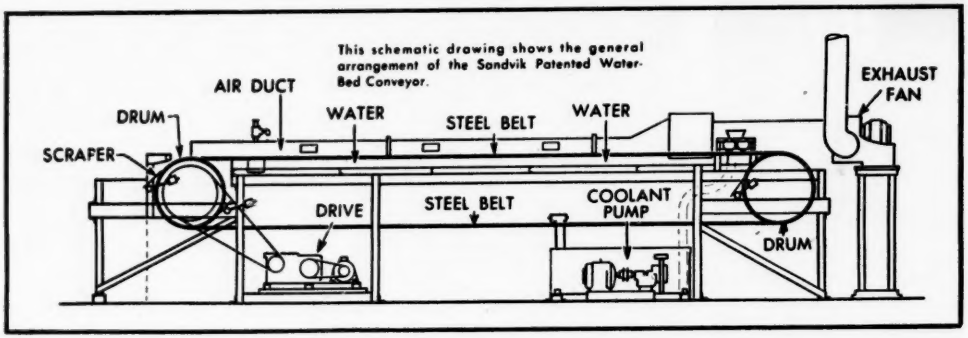
Owning and Operating

NATIONAL PACKAGING MACHINERY CO. & CARTONING MACHINERY CO.

69 ARBORETUM ROAD, ROSLINDALE, BOSTON 31, MASS.

Branch Offices: NEW YORK CLEVELAND CHICAGO
LOS ANGELES (KRUGH EQUIPMENT & SUPPLY CO.)

Food Equipment News



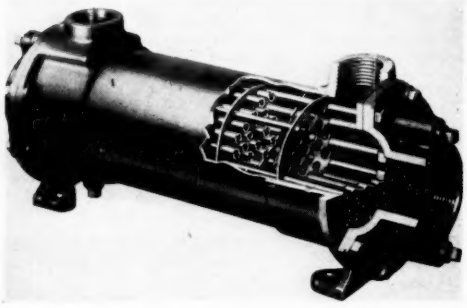
Water-Cooled Stainless Steel Conveyor 1

Designed for faster cooling and handling of gelatin, grease, margarine and similar products, a new type of cooling conveyor has been developed by the Conveyor department of Sandvik Steel, Inc., Dept. I, New York. It is a solid stainless steel belt that is actually supported by water.

In operation, top band of continuous belt passes over a waterbed formed by a series of tanks connected so as to form one continuous trough. When the conveyor is used for cooling, these tanks are usually filled with circulating water, though other coolants can be substituted if desired. When unit is operating, the water pressure is just enough to raise the belt off its supports. Surplus water overflows into adjacent gutters which collect and return it for recirculation.

Supplemental air-cooling is provided. The entire conveying band runs in an air conditioned "tunnel," a metal duct through which a suction fan pulls a continuous flow of clean, cool air.

These steel-belt, water-bed conveyor units are built for specific applications. Width and length of the belt, speed of operation and temperature of the cooling or heating medium, all depend upon the requirements of the individual application.

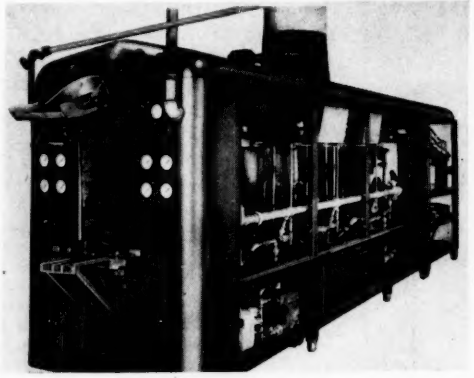


Standardized Heat Exchangers 2

A redesigned line of mass-produced, standardized heat exchangers at lower unit cost and with constant availability from stock is announced by Ross Heater & Mfg. Co., Inc., Dept. I, Buffalo, N. Y.

Research has enabled the manufacturer to determine design features, sizes and capacities in greatest demand, permitting these to be standardized and placed into mass production. New type "BCF" exchanger is all nonferrous construction and noncorrosive. Unit is lighter, yet stronger.

Inspection and cleaning are simplified with use of straight tube design. Transverse baffling directs flow across tubes. Permanently tight leakproof tube joints are achieved by company's method of roller expanding tubes into tubesheet holes. Unit may be installed in any position.



Double-Line Milk Can Washer 3

Designed to improve milk receiving room efficiency, a new "Dub-L-Line" can washer is announced by Damrow Brothers Co., Dept. I, Fond du Lac, Wis.

The new washer, with a capacity of 12 to 16 cans and covers per min., employs the double-row principle of washing. There is a common inlet for cans and covers. After the loading and draining stage, they divide into two parallel rows. Then the cans and covers pass through 13 separate stages and treatments, including cold-air drying. As they come out on the discharge conveyor, the cans are in upright position, with covers replaced.

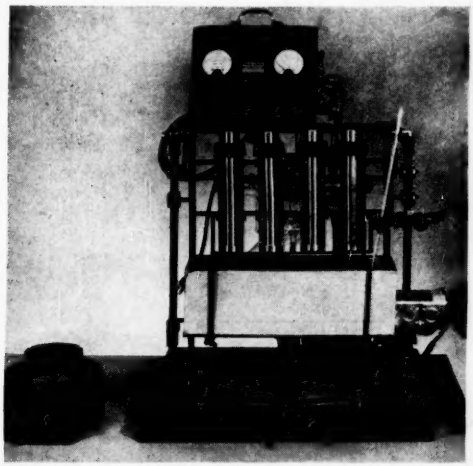
This unit makes possible a much shorter machine than a single-row 12-can washer, and is only about 18 in. wider.

Inlet and discharge are both centered in the new machine. At the inlet, this permits either a right or a left dumping arrangement, whichever will be most effective.

While the washer delivers 12 cans and covers per minute,

the fact that these are divided into two rows of six makes possible slower machine operation. Milk cans move more slowly through the washing operation and thus obtain more effective treatment. Important changes also have been made in the type and number of treatments, increasing both washing efficiency and operating economy. Other advantages of the slower speed are less wear on the machine parts and more gentle treatment of cans and covers—which mean longer service from both washer and cans.

A new can turnover and cover replacer are used on each row. The turnover employs a double rotating cradle which requires the turnover shaft to revolve only three times per minute for the 12-can capacity. Better timing and less wear is the result. The cover replacer, also operating at slow speed and with greater ease, pushes the covers onto the cans with more accuracy and safety. A positive can ejector on the centered discharge moves the cans with covers to the conveyors.

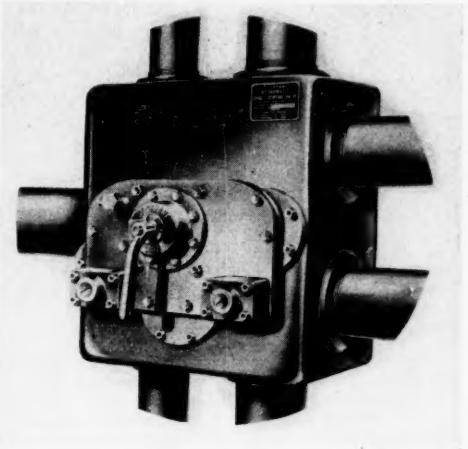


Multi-Sample Molecular Distillation 4

Molecular distillation for semi-micro analyses may be carried out on several samples simultaneously in a still now being manufactured by Distillation Products, Inc., Dept. I, Rochester, N. Y.

Operating under high vacuum to pressure as low as $1x10^{-5}$ mm. of mercury, the stills are used to separate heat-sensitive substances of high molecular weight. After samples are loaded, each still unit is immersed into an oil bath held at distilling temperature by electrical heaters which are controlled through a resistor. Distillate collects on a condenser and is removed to obtain the fraction after each distillation. Samples may range from a few milligrams to a gram in each still unit.

This analytical still was made for use in the company's biochemistry department to separate vitamin E from oils extracted from foods and other biological materials.



Single Central Valve 5

To reduce time required by the plant operator and minimize the possibility of faulty operation through error in manipulation, a single control valve for all types of zeolite softeners, ion exchange systems and pressure filters is announced by the Cochrane Corp., Dept. I, Philadelphia. Standard on company's line of zeolite sofeners and pressure filters, it is, in effect, a six-position valve.

In the control of zeolite systems, the four operating positions provide separate control of backwash, regenerant feed, rinse and service, permitting great flexibility, so that separate flow rates may be assigned to each operation, unaffected by the requirements for other phases.

In the control of pressure filters, in the majority of cases only three operating positions are essential; for control of backwash, rinse and service. However, a fourth position is provided for actuating such devices as a filter agitator or a filter aid or pre-coat type of chemical feed.

Unit is pilot-actuated, power for operation of the valve members being provided by the raw water itself.

Positive control of backwash and rinse rates is assured by individual rate controllers made integral with the valve. These provide automatic control independently of line pressure fluctuations.

(Continued)

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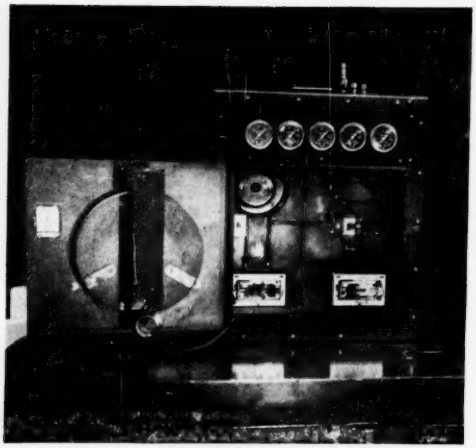
330 West 42nd St., New York 18, N. Y.

I would like to know more about the following items mentioned in January Food Equipment News:

(Print identifying numbers here)

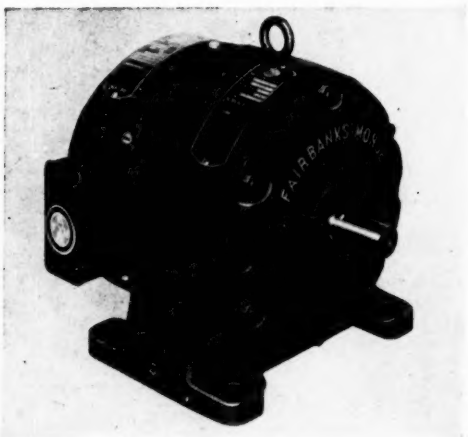
☐ ☐ ☐ ☐ ☐ ☐



Room Temperature and Humidity Control 6

Improved control of room temperature and humidity in plants in which specific atmospheric conditions affect the quality and quantity of output is possible with a new three-in-one instrument developed by Minneapolis-Honeywell Regulator Co. and its Brown Instrument division, Dept. I, Phila., Pa.

New device is available in either pneumatic or electric types. In the pneumatic model it contains a series of flush-mounted pressure gages which instantly indicate any changes occurring during processing. Entire controlling and indicating mechanisms, including an aspirating fan, are housed in a locked cabinet to prevent unauthorized adjustments and tampering. An added feature is a system which protects the sensitive measuring and controlling elements.



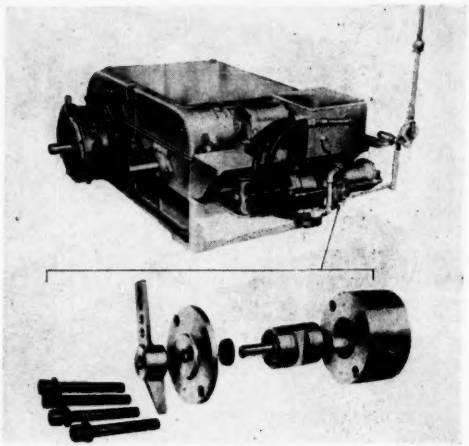
Axial-Air-Gap Motor Reducer 7

Announcement that the axial-air-gap motor is now available as a motor reducer is made by Fairbanks, Morse & Co., Dept. I, Chicago. Outstanding features of the axial-air-gap unit are space and weight reductions.

Available in ratings from ¾ to 10 hp., these units are symmetrical in design, with no separate right-hand or left-hand assemblies. And the motor may also be removed from the gear housing and run separately.

The motorgear employs two ratios of single helical gears with hardened and accurately shaved teeth arranged in simple gear trains, resulting in highly efficient mechanical transmission of power. It does not employ planetary gearing of any kind.

Another feature of the unit is that the motor and gear shafts are parallel, with the centerline of the motor coinciding with the center-line of the low-speed shaft. The motor shaft rotates on ball bearings, while the gear shafts are mounted on tapered roller bearings. The high-speed pinion, mounted on the motor shaft extension close to a double-row ball bearing, reduces deflection of this overhung pinion to a minimum. Bearings on the low-speed shaft are over-size to allow for a generous amount of outboard pull from a sprocket, gear or pulley that may be mounted on this shaft.



Valve for Hydraulic Controls 8

To provide maximum efficiency on hydraulic controls, a new, rotary type valve for variable speed transmission is now available from the Reeves Pulley Co., Dept. I, Columbus, Ind.

New valve is an exclusive feature of the company's hydraulic control which, applied to transmission, permits (1) entirely automatic speed regulation for synchronization of different machines and separate sections of a single machine; (2) maintenance of control tension and uniform peripheral winding speeds; and (3) maintenance of uniform pressure, weight, liquid level, temperature and other variable elements.

Simple in design and with few moving parts to wear, valve is actuated with 4-oz. pressure. Its stem is mounted on ball bearings to assure smooth operation, with minimum friction or "drag."

Because of its rotary design, eliminating lateral motion of the stem, the new valve can use, to full advantage, a tight-fitting, cup-type oil seal which prevents oil leakage around the valve stem.

Valve is being installed on all of company's variable speed transmissions, replacing stem-type valve previously used. It also is available for replacement on transmissions now in service.

Only two sizes of valves are required to fit all of company's transmissions using hydraulic controls.

(Continued)

There's just one metal for the tough process jobs —that's ALLEGHENY METAL

Data on the Uses of ALLEGHENY METAL in Various Industries

Available *now*—informative booklets on Allegheny Metal in the Chemical, Petroleum Refining, Brewing, Meat Packing, and Dairy Industries—others in preparation. Write for this valuable data on the field in which you are interested.

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Whatever corrosion problem you face—and no matter how the job is complicated by conditions of heat and pressure—we can meet and match it with the proper grade of Allegheny Metal.

This time-tested stainless steel is designed to do all jobs well. Its resistance to corrosive attack and heat oxidation—added to great strength and hard, smooth surface—knocks the dollar-mark out of maintenance and depreciation costs. Allegheny Metal equipment reduces clean-ups to minimum cost, too—and with the least possible "down" time.

● Let us help you to master the tough conditions, or to do almost any steel job *better.* Specify and use Allegheny Metal—*it's cheapest in the long run.*

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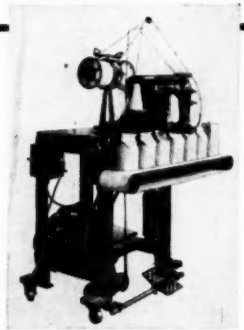
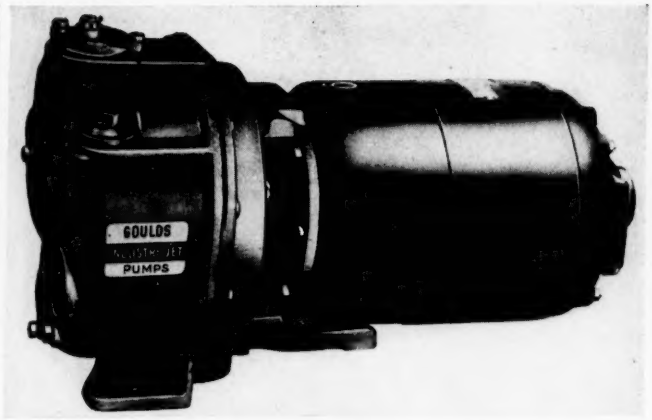
No two jobs are exactly alike—that's why Union Special builds a wide variety of bag closing equipment. It's also the reason why Union Special field representatives make a careful study of requirements before giving you detailed recommendations on the kind of equipment to install. *If it's "Union Special," it's right for the job!* UNION SPECIAL MACHINE COMPANY, 450 North Franklin Street, Chicago 10, Illinois.



Style 21800 N bag closing machine equipped with Style 60000 D sewing head for making Union Special's exclusive Dubl-Tape closure on small paper bags.

Union Special

Bag Closing Machines



Jet-Centrifugal Pump 9

For relatively small capacities against high pressures, a combination of the centrifugal pump with the jet ejector in one compact unit is announced by Gould Pumps, Inc., Dept. I, Seneca Falls, N. Y. Units are built in sizes of ¼ to 5 hp., capacities up to 35 gpm. Pressures range up to 190 lb. depending on capacity.

After initial priming, the centrifugal pump circulates the liquid through the unit, discharging first into a chamber where positive separation of air or gas is accomplished. Liquid then goes through the nozzle and diffuser and thence back into the centrifugal pump.

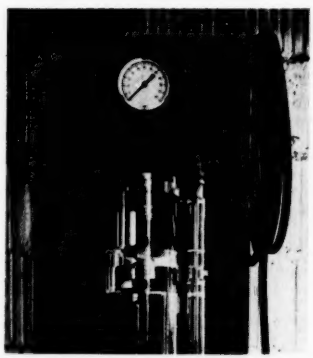
A high suction lift is obtainable by means of the vacuum created by the action of the jet. The suction connection leads directly into the area of high vacuum, while the discharge is taken from the top of pump casing.

Once initially primed, the pump is always primed. Should the suction line become exposed to atmosphere due to the liquid level dropping below the end of the suction pipe, the pump will automatically recover suction line prime when the suction pipe is again submerged.

Aluminum Duct 10

Approval of aluminum for use in the installation of ducts for air conditioning, warm-air heating, air cooling, and ventilating systems has been granted by The National Board of Fire Underwriters. Approval has been granted on the recommendation from the Committee on Air Conditioning of The National Fire Prevention Association. The Committee's recommendation is based on a careful study of aluminum's satisfactory performance in a large number of duct applications.

The 1948 edition of NBFU Pamphlet Number 90 will be issued soon and will contain the revision to include standards for ducts constructed of aluminum. The standards will cover installation for residences as well as for industrial buildings. New changes include a section which points out that aluminum, cadmium-plated or zinc-coated hardware and fittings—such as nuts, bolts, clamps, sheetmetal screws and rivets—should be used in the fabrication and erection of aluminum duct work.



Chlorine Feeder 11

Designed to feed sodium hypochlorite into water flowing under pressure in a pipe line, "Chlorameter" is announced by Paulsen Development Corp., White Plains, N. Y. Unit will feed accurately at rates as low as 1/400 gpm. It is therefore unnecessary in most applications to previously dilute stock solution. Low feed rate makes possible a high dilution ratio. Thus at 15 gpm. water flow, ratio can be 6,000 to 1; and at 100 gpm. it can be 40,000 to 1. Maximum ratio for other flow rates is calculated by multiplying water flow rate in gpm. by

400. Units instantaneously furnish chlorinated water of any required strength directly from cold water supply.

Operation of unit can be seen through transparent walls of plastic. Hypochlorite solution can be seen as it leaves feed orifice and enters water flowing in pipe. Level of sodium hypochlorite in storage chamber is visible, making it easy to determine when recharging is necessary. Perfomance can be witnessed in every detail and successful operation is thereby assured.

Chlorameter is constructed of a durable acrylic plastic similar to material used for turrets and other transparent panels in airplanes. It is inert in presence of sodium hypochlorite. Design has been carefully worked out to avoid use of metal, because ordinary metals corrode in presence of chlorine.

Only moving part is float, with result that maintenance and wear are at a minimum.

Smoke Control 12

Electric-eye smoke indicators have now been adapted to control over-fire air to prevent smoke in coal burning furnaces, according to an announcement by Brooke Engineering Co., Dept. I, Phila., Pa.

A light beam projected across a boiler or furnace flue shines on a photo-tube, which measures smoke density. When this density increases beyond a predetermined amount, a red warning light flashes and a timer relay circuit is closed. This starts the over-fire air jets.

These jets remain on for the period of time for which time relay circuit is set. This time is adjustable from 20 sec. to 20 min.

Upon completion of time cycle, jets are turned off. If smoke returns, entire cycle is repeated. Manual push button operation of jets is also pro-

(Continued)

CLEAR JEL

a NEW Food Starch

DERIVED FROM AMYLOPECTIN STARCH

UNIQUE IN

- Unexcelled clarity that will not cloud
- Flavor-emphasizing blandness free from cereal taste and starchy sensation
- Excellent keeping qualities that insure unusually long shelf life
- Resistance to breakdown on prolonged cooking
- Ability of pastes to recover original body and fine texture after freezing
- Pastes Properties: Non-cohesive • Non-jelling; Non-skinning • Heavy-bodied
- Commercially available in large quantities

DESCRIPTION: CLEARJEL is a modification of Amioca which is obtained from domestic bred waxy maize. CLEARJEL differs from Amioca, tapioca, potato and other tuber-like starches. It does not yield a rubbery cohesive paste but instead gives pastes with clear non-cohesive creamy textured, heavy bodied properties. It should be compared with natural gums such as tragacanth, karaya and other stabilizers.

Like Amioca, CLEARJEL is unique among starches because it consists entirely of amylopectin. It is believed to be a branched or non-linear polymer of glucose. Its molecules, being highly hydrated and unable to associate, give rise to heavy bodied, clear pastes free from any tendency to thicken or jell on ageing. Unlike Amioca, CLEARJEL pastes are non-cohesive.

PHYSICAL APPEARANCE: A white powder resembling ordinary corn starch.

CHARACTERISTICS: In 15 parts of water it will cook to a smooth, heavy bodied paste which is non-cohesive and characterized by excellent clarity, bland flavor and resistance to breakdown on prolonged heating even under acidic conditions.

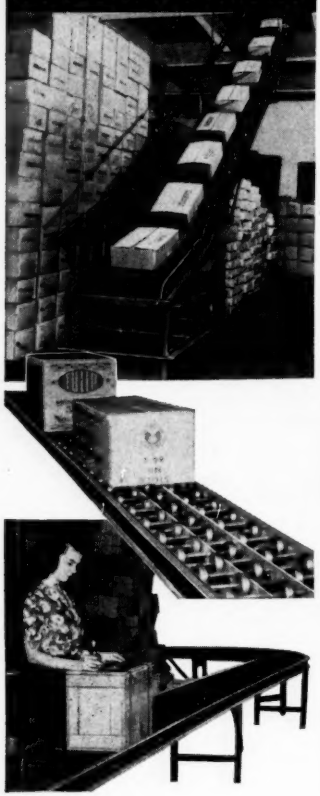
POSSIBLE APPLICATIONS: CLEARJEL is especially recommended as a stabilizer for fruit pies and tarts. Its clarity permits fruit colors to retain their original brilliance and adds the extra eye appeal of tempting, full bodied fruit. Its bland flavor actually adds tang to natural fruit flavors. All of these properties remain undiminished after many days of shelf life. CLEARJEL is also excellent for unbaked, frozen fruit pie fillings. Its pastes recover their original body after freezing. CLEARJEL can be used in a frozen chop suey base for chow mein and in fresh chop suey. It gives the sauce a fine texture and a soft jelling tendency. CLEARJEL offers the confectioner a stabilizer for caramels and marshmallows that not only enhances their eating qualities but also increases yield because of its higher moisture balance and added bulk. CLEARJEL will not cloud or set in cream sauces, clear gravies, a la king foods, etc. And it can be used as a pure food dusting starch.

WE'RE READY to match our research and laboratory efforts with yours in further exploration of CLEARJEL applications to your products. Address: National Starch Products, Research and Development Laboratories, 270 Madison Avenue, New York City. Plants: Dunellen, N. J., Chicago, Indianapolis and San Francisco. In Canada: Meredith, Simmons & Co., Ltd., Toronto and Montreal. In Holland: Nationale Zetmeelindustrie, N. V. Veendam.

National STARCH PRODUCTS

STARCHES — AND SPECIALTIES WITH EASILY DEMONSTRATED SUPERIORITY

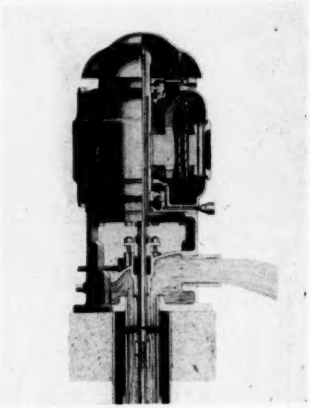
FERGUSON
ENGINEERED
CONVEYOR SYSTEMS



These time-saving, labor-aiding systems reduce materials handling costs and speed the movement of your packaged and unpackaged products from receiving docks through processing, storage and shipping areas. They are ruggedly constructed to give years of trouble-free service and designed for maximum efficiency with minimum maintenance. Write for detailed information.

HARRY J. FERGUSON CO.
WHEEL • PORTABLE BELT • BELT AND ROLLER GRAVITY CONVEYORS
123 WEST AVENUE, JENKINTOWN, PA.

vided. Smoke indicator will give a visual indication of flue gas density at all times. Modulated control of continuous over-fire air can be furnished if desired.



Turbine Pump 13

Capable of developing water capacities up to 5000 gph. from depths of 200 ft., a new turbine pump for small dia. deep wells is announced by Peerless Pump Division of Food Machinery & Chemical Corp., Dept. I, Los Angeles.

New pump, designated as the "Peerless Champion," fills capacity gap often found between capacities of the domestic water system and the larger deep well turbine pumps.

It is an open line shaft pump. Bowl and shaft bearings are lubricated by well's own water. No oil is used underground. Semi-open impellers, streamlined porcelain-enameled bowl sections, and rubber bearings all contribute to its smooth water lifting with minimum losses due to turbulence. All shafting is stainless steel. Utilization of long, cutless fluted rubber shaft bearings, spaced every 5 ft., gives resistance to normal sand and abrasive conditions. Impellers are die cast bronze, hand finished and balanced.

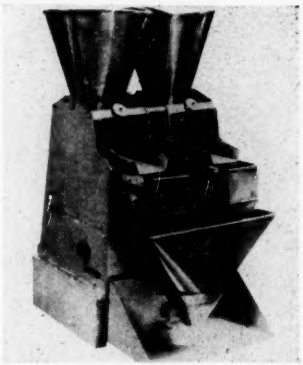
Adapted to a vertical tank pneumatic pressure system, pump is capable of developing pressures up to 90 lb. or more. In addition to its application to water development from wells for moderate gallonage requirements of commercial, light industrial and agricultural uses, it can be applied, close-coupled, to short settings for developing water from pits and sumps for supplying air conditioning, cooling tower service and other similar services where amounts of solids in suspension is negligible.

All types of driving arrangements are available.

Filter Cloths 14

Culminating several years of research, during which time many difficult weaves were formulated and tested, Filtration Engineers, Inc., Dept. I, Newark, N. J., announce new nylon filter fabrics. Facilities are available for tailoring cloths to fit any make of rotary vacuum, pressure filter or filter press.

Nylon cloths are resistant to acids, alkalies, and bacterial action. They are strong and resist abrasion and mechanical abuse, hence a lighter cloth (which is usually found to be more efficient than a heavier cloth) often can be selected. These synthetic cloths are easy to clean, and are woven to give the best combination of filtering qualities with maximum life and minimum blinding or plugging up.



Weigh Filling Unit 15

For handling a wide variety of dry materials, a simple and accurate net weight filling unit is announced by Glengarry Machine Works, Inc., Dept. I, Bay Shore, N. Y. Embodying two filling stations discharging into a single guide funnel, it is a very compact unit designed for bench mounting. Mechanism and electrical components are enclosed and all parts coming in contact with product are fabricated of stainless steel.

Each weighing station of unit is made up of four basic elements: Supply hopper, an electric vibratory feeder, a dump hopper mounted on a weigh beam, and a solenoid operated gate on dump hopper. In operation, feeder uniformly conveys material from supply hopper into dump hopper. When hopper receives a predetermined weight, a slight movement of beam cuts current to feeder, stopping flow of material. Upon completion of this operation, gate on dump hopper is opened by means of a solenoid, controlled by one of a number of optional

types of switches (platform trip, foot-operated, automatic, etc.), thus discharging contents into container.

Simple adjustments are provided for varying speed of flow and weight. By means of a switching arrangement, hoppers can be arranged to discharge alternately, for a high-speed filling line, or to discharge simultaneously, doubling amount per weighing where heavy packages are to be filled.

Drum Handling Aid 16

To simplify the handling of metal drums, a twin pusher attachment has been designed by Automatic Transportation Co., Dept. I, Chicago, for use on standard Skylift electric fork trucks of all capacities. With high pressure hydraulic operation and individual pushbutton controls, the rams can be used independently or simultaneously.

Completely self-contained, the unit includes its own motors and pumps. It can be detached quickly, by the removal of four bolts, and replaced by standard forks, permitting the truck to serve for general materials handling duties. An overhead guard is provided to protect the operator.

Battery Charge Indicator 17

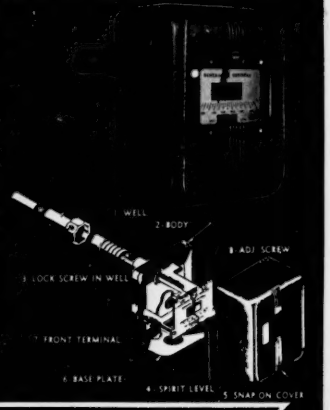
To prevent operation of a battery in an overdischarged condition, the Gould Storage Battery Corp., Dept. I, Trenton, N. J., announces a new indicator which gives the momentary charge condition of the battery. The indicator is marked off into four sections.

The Wheatstone Bridge type instrument can be used with 3, 6, 12, 15, 16, 18 and 24 cell batteries, a series of resistors and taps being arranged to permit the desired adjustment. A toggle switch disconnects the instrument from the battery during charge.

New L-578 SERIES
IMMERSION THERMOSTATS

8 FEATURES

1. ACCURATE AND POSITIVE IN ACTION. The result of design simplicity.
2. VISUAL LEVELING INDICATOR.
3. COMPLETE SELECTION OF TEMPERATURE RANGES AND SWITCH COMBINATIONS. Models to meet every requirement.
4. FAST REACTION TO LIQUID TEMPERATURE CHANGE. Two-inch well provides large heat-exchange area for direct and proximity contact with temperature-sensitive element.
5. CLOSE TEMPERATURE DIFFERENTIAL. Approximately 1° F. in most installation conditions.
6. TEMPERATURE SETTING EASILY CHANGED. Just one external adjustment screw to turn.
7. AMPLE CURRENT CAPACITY FOR USE IN ALL STANDING CONTROL SYSTEMS. Up to 15 Amp. switch rating.
8. MERCURY TYPE SWITCH. Dust-proof, tamper-proof, impervious to corrosive atmospheric conditions and "pitting" characteristics.



GENERAL CONTROLS
801 ALLEN AVENUE GLENDALE 1, CALIF.
Manufacturers of Automatic Pressure, Temperature & Flow Controls
FACTORY BRANCHES PHILADELPHIA • ATLANTA • BOSTON • CHICAGO • DALLAS KANSAS CITY • NEW YORK • DENVER • DETROIT • CLEVELAND • PITTSBURGH HOUSTON • SEATTLE • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES

FOR COMPLETE SPECIFICATIONS REQUEST BULLETIN SDL-32R-2. 253

New! TERRISS 3-SPEED
PORTABLE MIXER

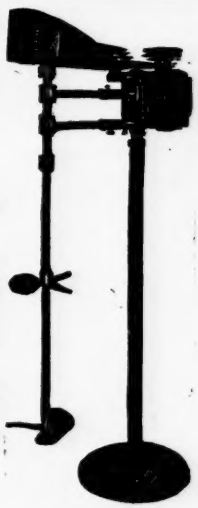
STIRS • BLENDS
MIXES • AGITATES

No more carrying heavy mixer . . . clamping to tanks . . . breaking side walls.

The New TERRISS 3-Speed Portable Mixer is an all-around unit that will take care of all your mixing, blending and agitating problems. If your tank or vat is below floor level the TERRISS 3-Speed Mixer will reach down and do a real job for you. If your container sits on the floor, a little adjustment and the mixing begins. If your tank or container is high off the floor, the TERRISS Mixer will lift up and do the mixing job.

All parts that touch your product are Stainless Steel. Standard belt drive permits propeller speeds of 175 RPM, 325 RPM and 575 RPM. Other combinations are available with simple adjustments. Both propeller shaft and stand are adjustable, permitting unlimited settings to fit any job in your plant.

Send your order today . . . money-back guarantee.



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. . . . DIVISION OF Consolidated Siphon Supply Co., Inc.
MANUFACTURERS SUPPLYING THE PROCESSING INDUSTRIES
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Even chalk responds to the magic touch of H & D packaging—of making the package a part of the product. This shelf package, several of which are packed in a master shipping box, affords adequate protection for a delicate, brittle substance. Distinctive one-color printing on a white surface is outstanding in eye appeal, promotes the brand name, commands customer attention. Tuck-in tab increases after-use convenience.

The Package Prompts the Purchase

Because this H & D box reduces packaging costs approximately 50% in addition to providing better product protection than the previous method of packaging, it is definitely part of the product. The economies it effects are felt by manufacturer, dealer and consumer. The box, developed in the H & D Package Laboratory, is *engineered* to the product, with no excess weight or bulk.

This corrugated H & D Prepak* is a major factor in the sales success of the product. The box is factory-packed to eliminate repacking and wrapping by the retailer, thereby reducing sales costs. The Prepak* is also a colorful counter or window display that stops traffic and increases sales. It is printed in 2 colors on lawn-green linen finish corrugated board. If your product can be packed in "units" or "sets," consider H & D Prepak*—the most economical way to pack and sell retail merchandise.

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Catalogs, Bulletins

This digest of manufacturers' publications is for the information of executives, superintendents, packaging men, food technologists and purchasing agents. To get copies of this new literature conveniently, fill out the coupon below, tear out and mail to Food Industries Reader Service.

Food Plant Equipment

Lubricated Plug Valves 51

Feature of 16-page illustrated catalog is cross-section view of one of a line of lubricated plug valves. Valves are offered in semi-steel, steel and 316 stainless in standard pipe sizes from 1-12 in. Tables contain dimensions, list prices, and sizes for lubricator sticks and adaptors.—*H. K. Porter Co., Inc.*

Magnetic Starters 52

Tables and schematic drawings give specifications for a. c. combination magnetic starters with circuit breakers, in 4-page Bulletin 4130, punched for insertion in notebook.—*Ward Leonard Electric Co.*

Combination Burners 53

For switching from oil to gas or vice versa, a combination proportioning burner is offered by 8-page Catalog No. 408. Dimensions, capacities and control data are given.—*Hauck Mfg. Co.*

Steam Jet Exhausters, Compressors 54

Construction, operation, capacities and dimensions of steam jet exhausters and compressors are shown by tables, charts and 4-color diagrams in 16-page Bulletin 4-E.—*Schuttte & Koerting Co.*

Ice Cream Packaging 55

For use in small and medium-size plants, a semi-automatic ice cream packaging machine, which requires only one operator, is described with drawings and specifications in single-sheet bulletin.—*Pure-Pak Div., Ex-Cell-O Corp.*

Safety and Relief Valves 56

Data on installation and use of safety and relief valves, detailed description of valves for general as well as chemical corrosion-resistant use, and selection charts for choice of valve are contained in 72-page Catalog 48. Triple capacity tables give water, air and steam capacities for various nozzle sizes.—*Farris Engineering Corp.*

Butter Printer 57

Cutting and printing of butter in all sizes, shapes and weights for hand or automatic wrapping are described in 16-page illustrated bulletin. Machines available have capacities of from 200 to 5,000 lb. per hr.—*C. Doering & Son.*

Vegetable Washers 58

All-steel washers with interchangeable soaking tanks and conveyor sections for carrots, potatoes, lettuce and mixed car shipments are described with text and drawings in 6-page bulletin.—*J. H. Platt & Son.*

Container Closures 59

"Profit by Stitching," 12-page illustrated bulletin, gives advantages, dimensions, and different models of the Silverstitcher, for stitching solid fiber and corrugated shipping containers.—*Stitching Wire Div., Acme Steel Co.*

Pumps for Sugar Industry 60

Centrifugal pumps for the sugar industry are described in 16-page illustrated Bulletin 48-9500. Installations include pump, juice and liquor processing; filtering; carbonation circulation or transfer; beet lifting; primary water supply and sewage.—*Pump Div., Byron Jackson Co.*

Flexible Metallic Hose 61

Galvanized steel and bronze flexible hose for water, steam, sugar syrup and other applications is outlined with photographs and specification tables in 10-page Bulletin 52-9.—*Pennsylvania Flexible Metallic Tubing Co.*

Refrigerating Storage Tanks 62

Cutaway view of stainless, refrigerating-wall storage tanks for the dairy is feature of 4-page bulletin.—*Chicago Stainless Equipment Corp.*

Gravity Wheel Conveyors 63

Conveyor systems for materials handling of all types of boxes, cases and packages of light to heavy weight are offered in various models by 24-page illustrated Bulletin 201. Lengths, widths, curves and capacities are given.—*Harry J. Ferguson Co.*

Double Roller Mills 64

For the flour milling industry, 12-page Bulletin R-85 presents new series of double roller mill, designed to use less power. Feature of bulletin is montage drawing showing construction and individual parts of mill.—*The Wolf Co.*

Industrial Exhausters 65

Anti-friction bearings, vibrationless fan and welded steel stand are offered in industrial exhausters by 4-page Bulletin 471. Non-ferrous and non-sparking models are available where explosion hazards or acid fumes make them desirable.—*The Day Co.*

Flour Sifters 66

Sifters, custom-built to the miller's specifications for speed, flow, number and depth of sieves, number and division of sections, and location of drive are presented in 8-page Bulletin 548. They are supplied with demountable-tray sieve frames.—*Norvell-Williams, Inc.*

Roller Bearings 67

Selection tables for roller bearings, dimensions, lists and photographs are included in 26-page Bulletin A-336-B. Base plates and floor stands are also covered. Graphic index aids in finding desired table.—*Dodge Mfg. Corp.*

Solenoid Contactors 68

Contactors of a. c. solenoid type for 50 and 100 amp. are described and NEMA ratings given in 4-page Bulletins 4452 and 4453.—*Ward Leonard Electric Co.*

Dual Screen Pulverizer 69

For reduction requirements of the soybean and cottonseed industry, for recovery and processing of dried distillers' grains in the distilling industry, and for utilization of by-products in the meat industry, the dual-screen pulverizer is particularly useful, according to 16-page, 3-color bulletin. Operating principles are given.—*Prater Pulverizer Co.*

Filtering and Cooling Equipment 70

Double pipe and multi-tube coolers, heat exchangers, sterilizing and filtermass filters are pictured and described in 4-page bulletin.—*Enzinger Union Corp.*

Cast-Iron Pulleys 71

Specifications and list prices are given for solid iron and split iron pulleys, with single arm or multiple arm, in 16-page Bulletin P-848.—*Sprout-Waldron & Co.*

Bottle Caser 72

Model 830-A bottle packer, as right- or left-hand machine, is described with blueprint specifications in 4-page bulletin.—*Standard-Knapp Corp.*

Cheese-Making Machinery 73

Cottage cheese manufactured by using Nu-

(Continued)

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vat equipment with or without circulating spray heating is described with drawings and dimensions in 8-page bulletin. Also discussed is Nu-Processor, unit for processing cultures, bulk starter and small lots of buttermilk.—*Meyer-Blanke Co.*

Pump and Motor Unit 74

General catalog data, specifications and price lists of the Monobilt, new pump and motor unit, are contained in 4-page Bulletin No. 103. —*Roy E. Roth Co.*

Materials Handling 75

Junior Catalog 487, pocket-size, 88-page booklet, contains comprehensive data on complete line of materials handling equipment, including hand, hydraulic and electric lift trucks; pallet trucks; skids; stacking frames; hoists; elevators and cranes.—*Barrett-Cravens Co.*

Pneumatic-tired Lift Truck 76

Gasoline-engine-powered, pneumatic-tired lift truck, rated at 2,000 lb. capacity with speed of 7 mph., is the Hyster 20, described with text and photographs in 16-page bulletin.—*Hyster Co.*

Compressors and Condensers 77

Compressors with hardened steel sleeves, safety head valve cage with ring type disk valves, positive forced-feed lubrication, and built-in suction strainer, are shown in back and front views and with parts disassembled in 6-page accordion folder.—*Schnacke, Inc.*

Carton Filler and Sealer 78

Fully automatic carton filler and sealer for end-fill folding cartons, which works at speeds of up to 160 cartons per min., is described and pictured 4-page Bulletin supplement 800-48. Machine will handle any free-flowing dry product or free-running fresh or frozen foods.—*Sprague-Sells Div., Food Machinery Corp.*

Two-Stage Homogenizer 79

"Superhomo," new homogenizer for milk and ice cream manufacturers, is announced in temporary bulletin. Eleven models will be available with either a single adjustable homogenizing stage or with two stages. Bulletin contains pictures, diagrams and capacity table.—*Cherry-Burrell Corp.*

Plant Supplies

Cocoa and Chocolate 80

Two small booklets, one on the use of cocoa and chocolate in the ice cream industry and the second on chocolate coatings, storage, melting and tempering, are presented by *Hooten Chocoate Co.*

Antioxidants 81

Protection against oxidized and metallic flavors in food products is offered by NDGA in 4-page bulletin. Directions for use in ice cream, butter cream candies, and other confections, are given.—*Nordigard Corp.*

Ion Exchangers 82

Applications of ion exchange in process industries is discussed in 6-page bulletin. Cutaway view of exchange unit is presented, and various types of resins are shown graphically. —*The Permuitit Co.*

Low-Temperature Brazing 83

Preparation, cleaning, fluxing and specific instructions on brazing of fittings to both pipe and tubing with Easy-flo and Sil-fos silver alloys are discussed and illustrated with diagrams in 4-page Bulletin 17.—*Handy & Harman.*

(Continued)

FMC UTILITY FILLERS

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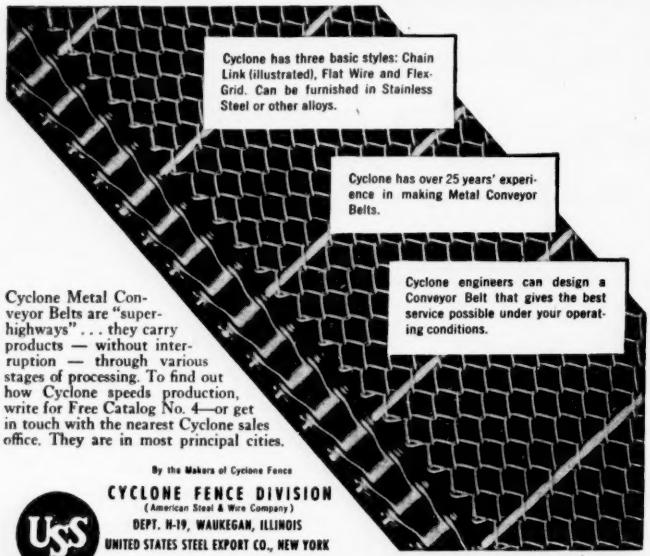
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Protective Coatings 84

Corrosion-resistant coatings for wood, concrete or metal surfaces are presented in eleven specific types. Ucilon F-400 is recommended especially for surfaces in contact with food products.—*United Chromium, Inc.*

Control Equipment

Liquid Level Control 85

Float-type liquid level controller with electrical transmission is offered in 4-page bulletin. Schematic drawing and photograph give operating principle. Metal float is only moving part of Acrafloat unit.—*Clapp Instrument Co.*

Strip-Chart Controllers 86

Complete line of strip-chart Micromax recorders and controllers for temperature, speed, gas analysis, electrolytic conductivity, pH, and other variables, is listed in 32-page illustrated Catalog ND44(1). Indicating controllers also are listed.—*Leeds & Northrup Co.*

Locker-Room Thermometers 87

Recording Thermometers for frozen food lockers, which meet all requirements of all state legislation, are described and pictured in 4-page Bulletin T839. Distance-type bulbs measure within range + 70 to − 30 F.—*The Bristol Co.*

Milk Testing Thermometer 88

Dial thermometer for platform testing of incoming milk is described in single-sheet Bulletin 98074. Response is said to be almost instantaneous.—*Taylor Instrument Companies.*

Miscellaneous

Laboratory Bibliography 89

"Curves and References," a booklet containing a bibliography of published procedures and methods for analytical analysis of interest to food processors is presented by *Wilkens-Anderson Co.*

Power Factor Calculation 90

Pocket-size Booklet No. 200-TEC-1077 explains in 20 pages the essentials of power factor in industrial plants and gives a digest of power factor calculation and correction.—*Electric Machinery Mfg. Co.*

Sweet Curd Cottage Cheese 91

History and processing methods for making improved sweet curd cottage cheese are discussed in 8-page booklet. Necessary equipment and recommended procedures are given.—*Meyer-Blanke Co.*

Commercial Cooking Equipment 92

Directory, "Where to Get It," lists 91 different types of gas appliances and 155 manufacturers of this equipment. Thirty-two page booklet is offered free to purchasers of gas equipment.—*American Gas Association.*

Powdered Egg Yolks 93

Use of spray powdered egg yolks in manufacture of ice cream is discussed in 10-page bulletin. Formulas for use and analysis of product are given.—*Armour and Co.*

Bronze Products Catalog 94

Information on wide range of bronze products and alloys is given in condensed Bulletin 95.—*Ampco Metal, Inc.*

Nickel Alloys Bibliography 95

Revised list of current publications on production, fabrication, properties and uses of nickel alloys for industrial applications is presented in 12-page List "A".—*The International Nickel Co., Inc.*

The New HAMILTON *White Master* **"MIX-COOKERS"!**

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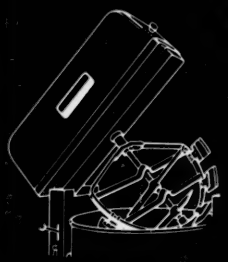

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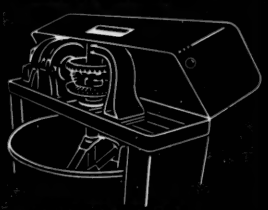

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New Technology

FRUIT PRODUCTS

Control of Jam Setting

Experimental work on the setting power of fruit jams has revealed a pH range within which setting will take place and outside which setting is impossible, also an optimum pH value at which maximum setting will occur. Data for a number of jams are shown in the table below, in which an interesting relation will be observed between the optimum pH and the nature of the insoluble solids in the jam. The more "pippy" jams, or those containing a proportion of whole fruit, have an optimum pH which is higher than that of the jams which do not contain fruit pulp.

Type of Jam	pH Range	Optimum pH
Apricot, Greengage, Damson, Plum	3.2-3.5	3.35
Apple and Damson, Apple and Plum	3.2-3.5	3.35
Apple and Raspberry	3.4-3.5	3.40
Orange Marmalade	3.4-3.5	3.40
Gooseberry	3.4-3.5	3.40
Black Currant	3.4-3.6	3.50
Seedless Bramble	3.4-3.6	3.50
Raspberry	3.5-3.7	3.60
Raspberry and Red Currant	3.5-3.7	3.60
Strawberry	3.7	3.70

It is necessary to control the pH of jams within these predetermined limits, and in routine laboratory control this can be accomplished by including small amounts of buffers in the formula, or excluding them. The most convenient and common buffers of the alkaline type are sodium bicarbonate and calcium carbonate; and those of the acid type, citric and tartaric acids. Appropriately used, these buffers will affect the pH, the rate of inversion of cane sugar during boiling, the setting time of the jam, and the loss of sulphur dioxide during boiling. In practice, the most important consideration in the use of buffers is their simultaneous effect on the pH value and the degree of inversion.

The author has listed a large number of conditions under which buffers should be used to produce the required simultaneous effects on inversion and pH value—raising or lowering both, raising one and lowering the other, and raising or lowering one without affecting the other. The nature of the pectin used in the jam, either in its natural form in the fruit or added as such, is an important factor in guaranteeing a good set. Particular care must be taken to avoid lapse of too much time between picking and cooking the fruit and thus to hold enzymic degradation of the pectin to a minimum.

Digest from "Laboratory Control of Jam Setting," by Ian Cameron, FOOD MANUFACTURE, Vol. 23, 455-57, Oct. 1, 1948.

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BAKING

Effect of Protein Content On Bread Loaf Volume

Results have recently been published of a four-year study of the relation between protein content and loaf volume of bread for each of 14 hard-winter and 8 hard-spring wheat varieties.

For winter wheat, the relation between loaf volume and protein content is essentially linear within a variety, shown graphically as a regression line. This differs for each variety, and the slopes of the regression lines increase as loaf volume level rises. Protein content accounts for nearly 90 percent of the variations in loaf volume within a variety, regardless of season, soil, and climate, provided subnormal samples are omitted. Loaf volumes for certain varieties differ, especially at high protein levels, amounting to 200 cc. at 13.5 percent protein, and 260 cc. at 16 percent.

Spring wheat varieties behave in much the same manner as winter varieties. The relation between loaf volume and protein content is essentially linear within a variety, and protein content accounts for fully 90 percent of the variations in loaf volume. Slopes of regression lines increase as loaf volume rises. Differences in loaf volume exist between varieties at the higher protein levels.

Digest from "Loaf Volume and Protein Content of Hard Winter and Spring Wheats," by K. F. Finney and M. A. Barmore, *Cereal Chemistry*, Vol. 25, 291-312, Sept., 1948.

PACKAGING

Kinetics of Package Life

Moisture uptake by packaged commodities depends on the moisture capacity of the contents of the package as well as on the resistance of the wrapper to the passage of water vapor. A part of the shelf-life therefore depends on the rapidity with which water vapor diffuses into the contents of the package after having passed the wrapper barrier.

The equilibrium of water vapor between a hygroscopic material sealed in a wrapped package and the atmosphere surrounding the package is a special case of the general concept of a fluid flowing down a gradient into a reservoir having capacity for and resistance to the fluid. Analogous cases exist for the flow of electricity and the flow of heat, and mathematical treatment of the problem is quite similar.

It has been found that the time required for packaged materials to come to complete equilibrium with the storage atmosphere is proportional to the logarithm of the "dishumor" of the goods. Dishumor is the amount which the goods lack of being in equilibrium with the storage atmosphere. Values for the dishumor fall between unity (for packages at the instant of their transfer to a new atmosphere) and zero (for complete equilibrium).

While this criterion is accurate for commercial packages, a similar expression has been developed empirically to show whether attainment of equilibrium depends predominantly on the resistance of the wrapper or on the bulk impedance to moisture diffusion of the package contents. Application to small packages indicates that surface resistance to the passage of moisture predominates, even in unwrapped packages. The importance of careful

(Continued)

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sealing of wrappers was brought out in the tests. The value of high-grade wrapping materials is largely lost if poor sealing causes leakage at the joints.

Digest from "The Kinetics of Package Life. IV. Diffusivity," by C. R. Oswin, JOURNAL OF THE SOCIETY OF CHEMICAL INDUSTRY, Vol. 67, 274-77, July 1948.

DEHYDRATION

Dried Corn

Preparation of dehydrated corn that preserves its natural flavor, tenderness, and color, and which reconstitutes with comparative ease, is revealed in recent patent specifications. Corn is husked, washed, blanched either on or off the cob, dried to a suitable moisture content, and then deformed to alter the natural cellular structure. Deformation may be followed by further drying.

Salient in the process is the deformation of the corn by passage between rolls, preferably soon after the initial drying to 10-30 percent moisture. Under such conditions the kernels have a higher moisture content at the center, which serves as a binder to hold them together. After deformation, the corn may be further dried to about 5 percent moisture.

Digest from U. S. Patent 2,446,162, issued July 27, 1948, on an application dated Feb. 12, 1944, to Paul W. Salo, Minneapolis, Minn., and assigned to General Mills, Inc.

FATS AND OILS

Extracting Cottonseed

Petroleum hydrocarbons in the range C_5 to C_7 have been studied to determine comparative yields and quality of oil produced from cottonseed. Other factors investigated were the effects of precooking seeds and inclusion of hulls on yield and color of extracted oil. Numerous solvents were used in a series of extractions with Soxhlet apparatus and Waring blendor, and comparative ratings were calculated for each solvent. By this method of comparison the methylpentanes are rated superior to the more highly branched isoparaffins and to the other hydrocarbons. Outstanding is 3-methylpentane. The cycloparaffins are rated as less satisfactory solvents; and benzene, the only aromatic type tested, was the poorest. Both cooking and dehulling of the seeds before extraction improve the color of the oil regardless of the solvent used.

On the basis of the tentative ratings, specifications for a "tailor-made" solvent should exclude aromatic hydro-

(Continued)

How asphalt makes or breaks an insulation job

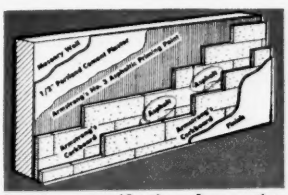
Workman for Armsrong's Contract Service dipping corkboard insulation in Armstrong's Erection Asphalt automatically held between 350° and 375° F.

THE kind of asphalt used and the way it's handled can make or break your insulation job. Asphalt does two vital things. It holds the insulation firmly in place, and it seals out air and moisture. The use of a poor asphalt, or the improper handling of asphalt on the job, can allow the insulation to loosen or the vapor seal to fail.

That's why Armstrong has devoted years of research to this phase of its insulation contract service. The kind of asphalt Armstrong workmen use, and the way they use it, add greatly to the performance of every Armstrong low-temperature job.

1. Material. Armstrong's Erection Asphalt has been developed to strict specifications. Exactly the right melting point, flash point, volatility, and solubility are assured. This odorless asphalt has been oxidized in refining to make it extra tough and chemically stable.

2. Handling. Asphalt must be heated to just the right temperature if it is to bond firmly. Armstrong workmen are equipped with thermostatically controlled tanks to hold dipping temperatures steady.



Armstrong specifications for erection of board-type insulations call for proper use of hot asphalt, a vital part of every well-applied insulation job.

3. Application. When applying insulation, Armstrong mechanics set their equipment near the work in progress to make sure the asphalt stays hot on the dipped insulation board and bonds it securely to the wall.

In mopping asphalt on floors, they cover only small areas at one time to avoid overcooling before insulation is applied.

If you plan to build or enlarge any low-temperature space, it will pay you to get full information on Armstrong's Complete Contract Service. It offers you expert engineering advice, top-quality materials, and workmen who know how to handle them properly. Write to Armstrong Cork Company, Industrial Insulation Department, 4201 Concord Street, Lancaster, Pa.

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CM overhead materials handling units are designed to increase plant output and lower production costs by mechanizing and speeding the movement of materials. If you are improving or expanding your plant, it will pay you to check up on CM industrial hoists. Three of the most popular units in the CM line are...

The CYCLONE Model M High speed heavy duty hand hoist. 96% efficient. 1 ton capacity weighs only 35 pounds. Sealed in lifetime lubrication. Capacities from ¼ ton up.

The COMET Portable, speedy, sturdy electric hoist. One-hand control. For plug in on 110, 220 or 440 volts. Capacities from ⅛ to 1 ton.

The METEOR Fast, heavy duty electric hoist. Airplane type cooling. Push button control. Single or two speed. Capacities from ½ ton up.

Write today for literature and the name of your local distributor who handles the complete line of CM overhead materials handling equipment.

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carbons, have definite low limits on cycloparaffin content, and consist largely of normal and isoparaffin hydrocarbons. Especially interesting are methylpentane concentrates having maximum purity commensurate with competitive price levels.

Digest from "Laboratory Extraction of Cottonseed with Various Petroleum Hydrocarbons," by A. L. Ayers and J. J. Dooley, JOURNAL OF THE AMERICAN OIL CHEMISTS' SOCIETY, Vol. 25, 372-79, Oct. 1948.

MEAT AND FISH

Preserving Crab Meat

Natural flavor and color of crustacean meat can be preserved, according to a recent patent, by canning in a regulating solution that has a continuous buffer action over a wide range of acidity. The base of the mixture is a 5-7 percent brine solution in which disodium phosphate and citric acid are dissolved in quantities varying with the characteristics of the raw material.

The mixture exerts a buffering action on the natural crustacean juice and keeps it to the desired hydrogen ion concentration of 4.0-6.5 pH. Shrinking or swelling of the canned meat is avoided, and metallic elements, such as iron and copper, are bound in the meat.

In commercial plant operation, the regulating mixture is prepared by dissolving 11.2 oz. of disodium phosphate and 7.6 oz. of citric acid in 5 gal. of 5 percent brine. The solution is used in sufficient quantity to cover the meat in the can, which is exhausted, closed, and processed in the usual way.

Digest from U. S. Patent 2,448,970, issued Sept. 7, 1948, on an application dated Mar. 19, 1946, to J. J. Ganucheau, New Orleans, La., and assigned to Southern Shell Fish Co., Inc.

DAIRY

Bacteriophage-Resistant Lactic Streptococci

Single-strain cultures of lactic acid streptococci will aequire an adaptation for growth in the presence of homologous bacteriophage. Persistence of this charaeteristic, however, depends upon the strain of organism. This was demonstrated in a study using two cultures and their homologous races of bacteriophage—a strain of *S. cremoris* obtained from the Dairy Research Institute of New Zealand, designated as H.P., and a strain of *S. lactus* from Iowa State College, No. 4.

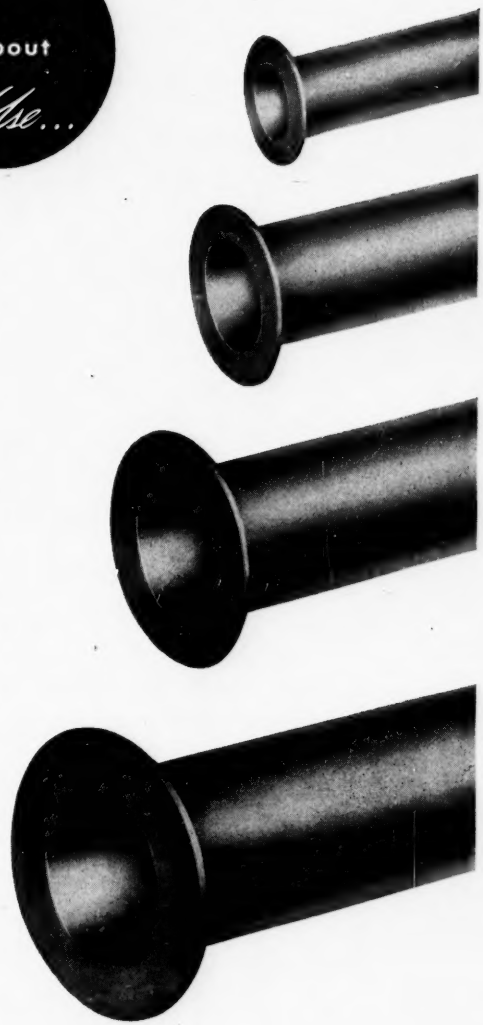
In the general plan of the experiment, the culture containing the lowest dilution of bacteriophage permitting coagulation of the milk after 24 hr. of incubation at 86 deg. F. was used to

(Continued)

THESE FLANGES

Answer Important Questions About

Which Stainless Tubing To Use...

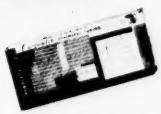


Here is another example of the results you can get when you put Carpenter's experience with Stainless Tubing to work in your plant.

These Van Stone flanges were done cold, with the flanges rolled-out from the tube wall. Expansion is uniform throughout the flanged area. The corner at the back of each flange is sharp—with no weakening of the metal's structure.

When you are selecting Stainless Tubing and planning your fabrication jobs, it will pay you to make full use of Carpenter's experience. Want proof? Drop us a line, and we will work with your engineering staff.

SLIDE CHART DATA ON STAINLESS TUBING



This Carpenter Stainless Tubing Slide Chart provides information that has never before been available in such easy-to-use form. It contains data on Velocity Constants, Mass Velocity Constants, Areas of Tube, Physical Properties, etc. For your copy, just send us a note on your company letterhead.

THE CARPENTER STEEL COMPANY

Alloy Tube Division **• 109 Springfield Road, Union, N. J.**

Carpenter

STAINLESS TUBING

"MORE THAN CORROSION RESISTANCE"

A TYPICAL "GEYER" FILLING MACHINE INSTALLATION

GEYER
SINCE 1914

SHOWN IN OPERATION
A "Geyer" Preserve and Jelly Filling Machine.

Fine

FILLING MACHINES FOR DIVERSIFIED NEEDS

FILLING MACHINES FOR

JAMS	GREASE
SYRUP	LACQUER
JELLIES	MAYONNAISE
CHEESE	PEANUT BUTTER
GLUE	APPLE BUTTER
PASTE	VANISHING CREAM

AND SIMILAR PRODUCTS

"GEYER" Filling Machines are versatile, durable and adaptable to innumerable packaging requirements. All have these features:

MULTIPLE FILLING • MINIMUM WEAR • VARIETY OF MACHINE SIZES • HIGH QUALITY WORKMANSHIP • POSITIVE PISTON DISPLACEMENT • HIGH OPERATING EFFICIENCY • FULL AUTOMATIC OPERATION.

Under critical operating conditions there is no drip, machines are clean filling, and readily adjustable to any size or shape container. Maximum production output assured.

CHECK THESE REPRESENTATIVES

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BOSTON (16) Salleck & Newbert Inc. 131 State St.
CHICAGO (4) Clyde E. Austin & Son, 53 W. Jackson Blvd.
DENVER (9) Edwin F. DeLine Co., 224 W. Alameda Ave.
SAN FRANCISCO (5) J. B. Bellamy & Co., 111 Main St.

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THE FILLER MACHINE CO. INC.

1248 E. Montgomery Avenue, Philadelphia 25, Pa.

inoculate flasks for the succeeding series. Two series were started each week, on Tuesdays and Saturdays. Cultures selected for use in the succeeding series were stored at 32 deg. F. until needed.

The steadily increasing resistance to bacteriophage became noticeable in the H.P. strain soon after the start of Series 3. By Series 5, this culture showed practically the same titratable acidity as the control. No. 4 strain attained its maximum adaptability by the end of Series 2.

Determinations made on cultures stored for 4½ months at 32 deg. F. showed that the adapted H.P. culture had almost completely lost its previously acquired resistance, whereas No. 4 culture developed acidity as rapidly as the control.

Digest from "The Adaptability of Two Strains of Lactic Streptococci to Growth in the Presence of Homologous Bacteriophage," by R. O. Wagenaar and C. C. Prouty, JOURNAL OF DAIRY SCIENCE, 858-66, Oct. 1948.

FERMENTATION

Intensified Mashing

Beer fermentations in wort of 11-14 original gravity yield yeast crops which take up only a small fraction of the available nutrients—17-18 percent, for example, in the case of nitrogen. In effect, the alcohol formed seems to inhibit further growth, and increasing the nitrogen content of the wort does not increase the yeast crop.

When worts of very low gravity are fermented, the lesser amount of alcohol formed no longer inhibits yeast growth, and the percentage of nutrients utilized may be greater than in more concentrated worts of the same relative composition. By altering the mashing intensity, variations in mash composition with respect to nitrogen, phosphorus and maltose content can be produced.

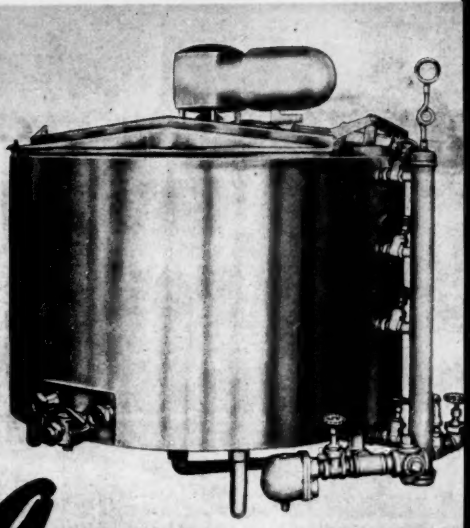
Experiments of this type on all-malt worts showed that the yeast crop in worts of 3-deg. Plato depends on the nitrogen content of the wort only, and that it is not appreciably affected by the phosphorus or maltose, even though the attenuation increased from 67 to 85 percent for the higher maltose worts. In strong worts of 12-deg. Plato, having a 50 percent difference in assimilable nitrogen, the yeast crops differed by only 6 percent. The same worts diluted to 3-deg. Plato differed by 32 percent in their yeast crops in favor of the higher nitrogen wort.

Production of thin worts of high assimilable nitrogen content required slow mashing at the lower temperatures—up to 2 hr. at 122 deg. F. prior to saccharification at 145 deg., for ex-

(Continued)

★ MOJONNIER ZONE-CONTROL VAT

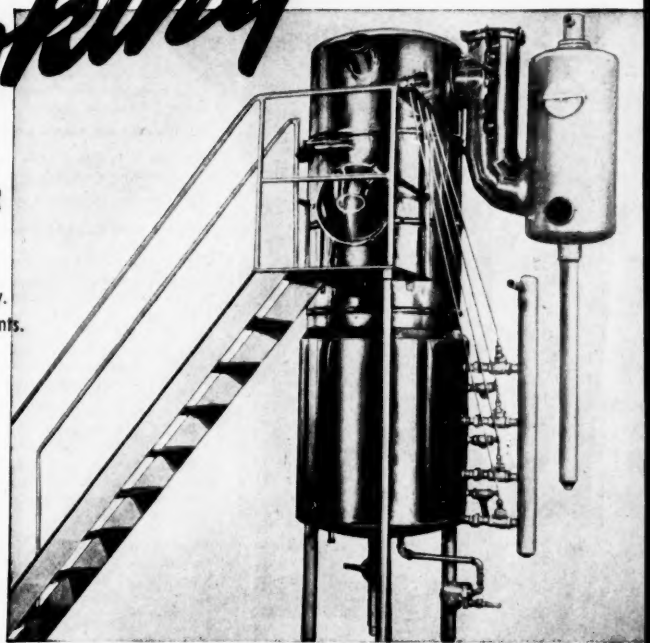
- Ideal for heating a wide range of products.
- Small or large batches heated without steam loss or burn-on.
- Separate heating control of each zone.
- Coil-free, mirror-like interior — easy to clean.
- Heavy viscous or free-flowing liquid products heated and agitated thoroughly, rapidly.
- All-welded, stainless steel construction throughout, exceeding most rigid sanitary requirements.
- Baffles and agitator scientifically located to insure complete and equal mixing action for every product particle.
- Bridge sturdily constructed, easily supporting hinged covers and sanitary power unit.
- Provides fast heating and cooling.
- Mojonnier engineered vats are available for every application.



Condensing or Cooking

★ MOJONNIER FRUIT SPREAD COOKER

- Rapid evaporation at low temperatures.
- Coil-free interior—heating surface in side wall.
- Coil-wall construction maintains maximum efficiency.
- Side condenser permits installation in low ceiling plants.
- Retains natural product flavor.
- Condenser designed for low water consumption.
- Completely packaged unit, ready for immediate operation.
- All-welded stainless steel sanitary construction—easy to clean.
- Simplified, economical operation — streamlined design.
- Backed by years of successful evaporator installations in food plants all over the world.
- Send for your copy of descriptive Bulletin No. 154.



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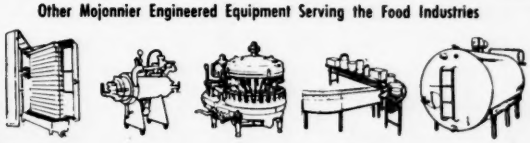
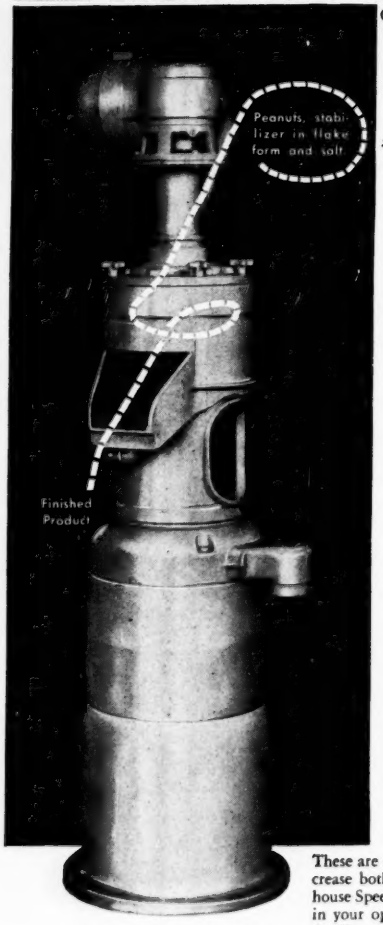
Mojonnier

Other Mojonnier Engineered Equipment Serving the Food Industries



Compact Coolers (Senior, Junior) | Tubular Heat Exchangers | Vacuum Fillers | Conveyors (Bottle, Case, Can) | Cold-Wall and Plain Storage Tanks

Now YOU CAN INCREASE YOUR PEANUT BUTTER PRODUCTION *and* PROFITS...!



MOREHOUSE
SPEEDLINE

Peanut Butter Mill

Gives You 4 Great Advantages

1. In one pass - depending upon type desired - either a stabilized or unstabilized product.
2. Constant and uniform grind.
3. Does not require other costly processing equipment.
4. Eliminates all other handling.

1200 to 1800 pounds per hour

Complete processing in one unit — no accessories needed. High-capacity, uniform production — 1200 to 1800 pounds of finely ground peanut butter per hour. High-quality production — adjustable without stopping. Only Morehouse Speedline gives you all these advantages.

Based on the famous Morehouse principle that has multiplied production in many industries and fully proven in use, it is ready for you now. It's compact and portable — dependable and economical in operation — low in first cost.

These are some of the reasons why you can increase both volume and profits with a Morehouse Speedline. Plan now to use the Speedline in your operation. Write today for complete details.

New 1948 Model SB-1403
70 in. high, 21 in. wide

Get MORE with MOREHOUSE

MOREHOUSE
Symbol of quality for over 50 years

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ample. By such intensified mashing, especially when accompanied by souring with lactic acid or lactic organisms to pH 5.4-5.5, the assimilable nitrogen may be increased as much as 25 percent. Where brewing practice requires the production of thin beers, a condition prevailing in Germany at the present time, intensified mashing increases the brew-house yield and improves the yeast output of the fermentations.

Digest from "The Influence of Mashing Intensity on the Yeast Increase," by P. Kolbach and K. Schwabe, DIE BRAUEREI WISSENSCHAFTLICHE BEILAGE, Vol. 1, 1-3, Sept. 1948.

ENGINEERING

Weighing Dry Materials

Weighing and discharging of dry materials, such as ground roasted coffee, in predetermined quantities in packaging operations is the object of apparatus recently patented.

The machine has separate bulk and dribble feeders, each discharging through its own hopper into a common scale bucket, but both operated by a single vibrator. Means are provided to interrupt the bulk feed near the end of a weighing cycle, while continuing the dribble feed to facilitate accurate weighing. When the scale bucket contains an accurately weighed charge, it is automatically dumped into a suitable package.

All operations are electrically controlled. The machine may consist of a single weighing unit or a number of such units arranged side by side and operating concurrently.

Digest from U. S. Patent 2,443,350, issued June 15, 1948, on an application dated Jan. 15, 1946, to H. A. Gilbert and I. L. Tolf, Battle Creek, Mich., and J. J. Thayer, Elkhart, Ind., and assigned to General Foods Corp.

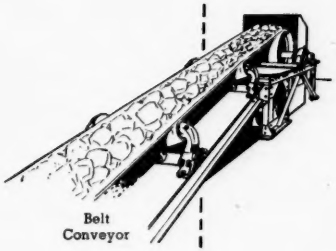
Confection Forming

Continuous mechanical production of shaped and coated confections is the object of a mechanism described in a recent patent. The essential elements are a flexible endless belt and a resilient endless membrane traveling horizontally around a pair of wheels spaced suitably apart. The belt of rubber-like material has molded into its structure a series of cups or depressions that determine the shape of the confection, each cup having a vent in the bottom. The membrane travels in contact with the belt, covering its depressions. In the course of their travel the belt and membrane pass under hoppers containing the confectionery constituents, and over a vacuum chamber.

In making chocolates, for example, the first hopper delivers onto the mem-

(Continued)

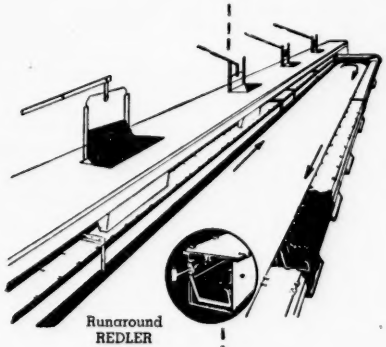
Is "Materials Handling" a Profit Thief in Your Operation?



Belt Conveyor

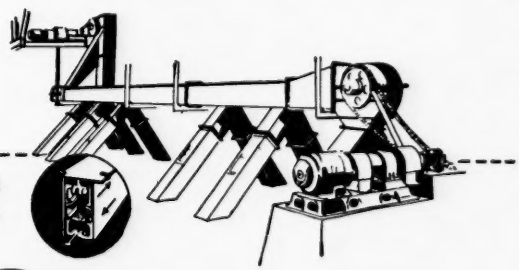
Bulk materials handling systems built years ago for a particular set of conditions may be "getting by" under new conditions and products.

Perhaps many of today's production difficulties can be traced to plant layout, cost accounting, or peculiarities of your particular operation. But, remember, it is *often* materials handling.



Runaround REDLER Conveyor

Let us make a pretty responsible statement: *In about 8 out of 10 operations, some saving can be made by reviewing the handling of bulk materials.* Stephens-Adamson engineers are available to assist. They represent a staff thoroughly experienced in applying every type of conveyor, elevator, and hoist from the *complete* S-A Line to every type of bulk material and plant layout. Let us talk this over with you — say so in any convenient way — phone, wire or letter.



Horizontal REDLER Conveyor

STEPHENS-ADAMSON MFG. CO.

6 RIDGEWAY AVENUE, AURORA, ILLINOIS ★ LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of

BULK MATERIAL HANDLING EQUIPMENT

Laboratory Tested and Controlled

TO DO A BETTER SANITIZING JOB

EVERY TIME

The ORIGINAL Quaternary Ammonium Germicide

243189R

This Control No. Guarantees

POTENCY
UNIFORMITY
QUALITY

Insist on getting only

GENUINE **Roccal** BRAND SANITIZING AGENT

Reg. U. S. Pat. Off. and Canada

USES IN FOOD INDUSTRY

To Sanitize:

- STORAGE BINS
- FREEZING UNITS
- REFRIGERATORS
- CONVEYORS
- TANKS
- PROCESSING EQUIPMENT
- PACKAGING EQUIPMENT
- TRUCKS
- WALLS AND FLOORS
- WASH ROOMS
- AND AS A HAND RINSE FOR HELP

In the Food Industry, the importance of using only the best in sanitizing methods cannot be over-emphasized.

In Roccal, the *original* quaternary ammonium germicide, the food industry is offered a sanitizing agent that is laboratory controlled and tested. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germ-killer. In recommended dilutions, it is non-poisonous, virtually odorless and tasteless. It is non-irritating to the skin and no more corrosive than plain water.

Roccal can be used for every sanitizing job in processing and packaging in the following food industries: milk, cream, ice cream, butter, cheese, egg breaking, sugar, fish, poultry, fresh frozen vegetables and fruits, meat products, cereal products, candy and beverage, wherever the product comes in contact with equipment. Also to keep walls and floors sanitary.

Start using Roccal today—you'll find that better sanitation is good business.

SPECIAL MARKETS—INDUSTRIAL DIVISION

WINTHROP STEARNS — Winthrop-Stearns INC.

170 VARICK STREET, NEW YORK 3, N. Y., Dept. W-19

brane a fine mixture of coating material that is immediately melted into a film as it passes under an electrical heating element. Passing over the vacuum chamber, the membrane is drawn into the cup, which then receives a quantity of the confection center. Finally, an additional quantity of coating material is dropped onto the membrane and melted into a film as it passes under another heating element.

After the confection is thus formed and cooled, it comes in contact with an endless follower belt that holds it in place and travels with it to a point on the lower side of the machine. When the follower belt leaves the forming belt, the membrane containing the confection reflexes to its normal position and causes the confection to be deposited.

Digest from U. S. Patent 2,448,786, issued Sept. 7, 1948, on an application dated June 8, 1946, to Charles E. Faxon, Republic, Wash.

MISCELLANEOUS

Determining Powder Density

Apparent, or bulk, density of powders is an important property having a direct bearing on package size and fill. It is not, however, an easy property to measure. Bulk depends on closeness of packing of particles, which in turn depends on their shape, true density, and state of compression.

For measuring apparent density, a simple device may be used. It consists of a 250-ml. graduated cylinder resting on a pad of rubber held in a frame in such a way that the graduate can be lifted 1 in. and dropped to the pad. The powder to be tested is rubbed gently through a 30-mesh sieve, and 40g. of this sifted powder is placed (without compacting or shaking) in the cylinder. The cylinder is closed with a stopper, then lifted and dropped 50 times onto the rubber pad at the rate of one drop every 2 sec. The volume of powder is read off the graduations on the cylinder, and the apparent density is the ratio of the weight of the powder to its volume in ml.

Final volume of the powder is affected by the number and height of the drops, but only slightly by the number per minute. Size of the sieve also has an effect, smaller mesh sizes tending to break up the particles, and larger mesh sizes to permitting aggregates of them to pass through. Because of these factors known to affect the final figure, the result depends on an arbitrary selection of height and rate of dropping the cylinder and the number of drops. The results are quite

(Continued)

You can cut

REFRIGERATION COSTS

When Handling

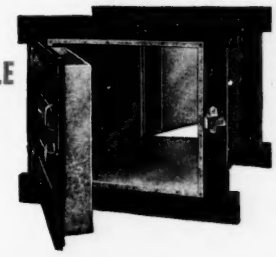
CANS, CRATES, KEGS

CAN AND CRATE PASSING DOOR

The Auto Close doors swing open readily and close automatically when the cold storage doors open. This checks the inrush of warm air and saves refrigeration. The door can be fitted into a conveyor system or used with its own roller conveyor.

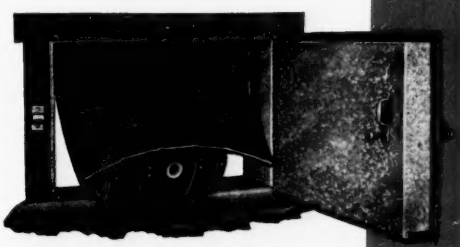
ICE CREAM CAN PASSING VESTIBULE

The vestibule is equipped with a cold storage door at each end. Maximum loss of cold air is limited to the volume of the vestibule because either door is always closed whether loading or unloading. Vestibule holds six to nine cans in various arrangements.



KEG PASSING DOOR

A flexible light weight insulating curtain of moulded material prevents the loss of cold air when the door is open. The movement of the key lifts the curtain without shock or abrasion as it passes. It immediately drops back in place and air movement is cut off.



These Jamison-Built Doors permit the speedy passing of cans, crates, boxes, packages or kegs in and out of the refrigerated space. Each of the methods illustrated is particularly well suited to the temperatures and type of container. The loss of cold air and the entry of warm air during the time containers are moved in and out of refrigerated storage rooms is held to a minimum. The resulting savings in refrigeration costs can be substantial.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

Standard types of Jamison-Built doors are available for a wide range of temperatures and applications. For special requirements doors can be built to your specification regardless of size, character or duty.

Write for new catalog that gives helpful information on cold storage door selection.

JAMISON COLD STORAGE DOOR CO., Hagerstown, Maryland

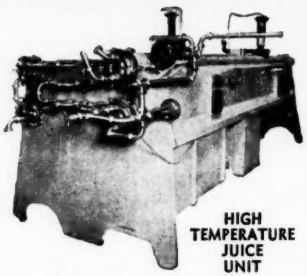
The Oldest and Largest of Cold Storage Doors in the World

BUILT BY CRCO FOR

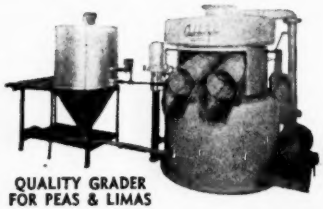
Quality Production

AT A LOWER COST

Modern processing equipment that will insure a greater percentage of quality pack with lower labor costs—a definite CRCO achievement to insure increased profits for every food processor.



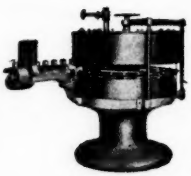
HIGH TEMPERATURE JUICE UNIT



QUALITY GRADER FOR PEAS & LIMAS

SANITARY BLANCHER

BEAN SNIPPER



LIQUID FILLER

Plan Your Lines With CRCO Equipment

CRCO QUALITY GRADER—For peas and lima beans, delivers a greater percentage of the more tender product than any other equipment available.

CRCO BEAN SNIPPER—Has the exclusive individual knife arrangement that insures perfect, clean-cut snipping without bruising or injuring the product.

HIGH-TEMPERATURE JUICE UNIT—Pre-heats, pasteurizes and cools juices to filling temperature—all in a continuous high-speed operation

SANITARY BLANCHER—Fully automatic trunnion type, discharging product with blanching water to draining reel, thus avoiding damage to the product.

FILLERS—The famous CRCO-Ayars line, for filling practically every type of product.

Send for literature and prices.

CHISHOLM-RYDER CO. INC.

Niagara Falls, New York

Chisholm-Ryder Company of Pennsylvania, AN AFFILIATE — Ayars Machine Company, A Subsidiary

239

reproducible, however, and the final determination of apparent density approximates very well the "packing density" found in bags and barrels of powders.

Digest from "A Method for the Determination of the Apparent Density of Dry Powders", by W. B. Ault, JOURNAL OF THE SOCIETY OF CHEMICAL INDUSTRY, Vol. 67, 313-15, Aug. 1948.

Inhibitors for Quaternary Ammonium Compounds

Numerous compounds have been tested as inhibitors of germicidal action in evaluating the efficiency of quaternary ammonium salts. Although many of them appear to be satisfactory in laboratory tests, some cannot be used on account of their bacteriostatic properties in possible use dilutions. Others make the petri dish opaque and interfere with colony counting, and still others are impractical for use at the high concentration required. Lecithin and naphuride sodium proved most satisfactory, and are not bacteriostatic in use-dilution ranges.

At a ratio of inhibitor to quaternary of about 20:1, they demonstrate inhibitory properties where *Escherichia coli* alone is used as a test organism. Indications are, however, that for certain other test organisms they are either ineffective or less effective, and that higher ratios are required.

Digest from "Inhibitors for Neutralizing the Germicidal Action of Quaternary Ammonium Compounds," by G. R. Weber and L. A. Black, SOAP & SANITARY CHEMICALS, Sept. 1948.

Egg-Meat Treatment

Inhibiting proteolytic action in shelled eggs by the addition of molecularly dehydrated phosphate is the subject of a recent patent. The inventor defines a molecularly dehydrated phosphate as one having a molar ratio of R_2O to P_2O_5 not greater than about 1.7:1, which can be considered as derived from a monobasic or dibasic orthophosphate or from orthophosphoric acid by elimination of water of constitution therefrom. He has found that the addition of such phosphate to egg whites or yolks, separately or together, inhibits proteolytic action or coagulation, either upon accidental thawing of frozen eggs or upon heating to dry them. In the drying process the temperature of phosphate treated eggs can be raised from the customary 140 deg. F. to about 160-180 deg. F. without danger of coagulating the albumen, thus speeding the drying process. The amount of phosphate required is 5-10 percent by weight of the albumen.

Digest from U. S. Patent 2,445,879, issued July 27, 1948, on an application dated Oct. 8, 1945, to George O. Hall, Murryville, Pa., and assigned to Hall Laboratories, Inc., Pittsburgh, Pa.

SPECIAL ANNOUNCEMENT

NOW!

IT CAN BE TOLD

A REVOLUTIONARY PLASTIC FOOD CONTAINER COATING HAS BEEN DISCOVERED

ODORLESS ☆ TASTELESS ☆ DURABLE ☆ NON-TOXIC

FOR FOOD PACKERS:

Now it is possible to coat orchard and field lugs so that their life is tripled . . . their weight is constant . . . and cleaning is a simple matter . . . as one packer has stated, "In five years of searching we have never found a lug coating so ideal." Brine tanks, too, become unaffected.

FOR THE TRUCKING INDUSTRY:

Years have been spent looking for an impregnating plastic coating to replace and improve on the old wax method of sealing the interiors of motor trucks and trailers. Now it is here. Tests have proven that this coating is unaffected by moisture . . . fungus . . . dry rot and bacteria.

FOR THE DAIRYMAN:

Moisture absorption in the milk crates of the dairy industry has long been an unsolved problem. Now, ask your supplier to give you facts and figures on the successful application of this coating by dip process to your wooden crates.

And

THE GREAT AMERICAN CONTRACTOR:

Plywood concrete forms have long been coated with . . . OIL . . . LACQUERS and the nationally-known "PLASTIGLAZE" but never in the history of building has it been possible to buy a mill-applied PLASTI-GLAZE PLYWOOD PANEL — so created to insure . . . 25 REUSES . . . TRUE ARCHITECTURAL CONCRETE . . . AND THE FINEST STRIPPING THAT HAS EVER BEEN SEEN . . . Don't believe us . . . ask your lumber dealer and write direct. This panel is available.

CALRESIN

CORPORATION

8564 WASHINGTON BLVD. CULVER CITY, CALIFORNIA

For Consumer Size

ECONOMIZE WITH

Bemis Deltaseal Bags

THE SMART-LOOKING PACKAGE WITH SALES APPEAL

Deltaseal Reg U S Pat Off

Many products such as sugar, flour, rice, salt, beans, corn meal and cereals are packed in Deltaseal Bags with savings in packaging costs that will amaze you.

Your brand will be rich and colorful on the excellent printing surface of Deltaseal Bags.

Deltaseal Bags and the Deltaseal packaging System permit major operating economies in your plant. Your Bemis representative will give you all the details.

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Books

Foods Evaluated

FOOD PRODUCTS, 4TH EDITION. *By Henry C. Sherman. Published by The Macmillan Co., 60 Fifth Ave., New York City,* 1948. 428 *pages;* 6¾x8½ *in.; cloth. Price,* $4.80.

This is a primary discussion of food from the aspects of production and nutrition. Its chapters embrace practically all the food categories. In most cases the subject is approached from four points: 1. Production and marketing; 2. sanitation, inspection, and standards of purity or grades; 3. general composition, mineral content, and vitamin values; and 4. characteristics, digestibility, and nutritive values.

In this fourth edition, revisions have been made in the tabulations of the amounts of individual amino acids in the different food proteins, and in the suggested reading matter following each chapter. This reading matter is listed to facilitate further study of the subject along chemical, economic, nutritional, sanitary or technological lines, as the reader may choose or as his requirements may dictate.

Papers on Nutrition

SELECTED WORKS OF HENRY CLAPP SHERMAN. *Published by The Macmillan Co., 60 Fifth Ave., New York City,* 1948. 428 *pages;* 6¾x8½ *in.; cloth. Price,* $5.

This collection of the works of the Mitchell Professor Emeritus of Chemistry, Columbia University, is concerned entirely with nutrition. The food technologist, however, will find here a convenient reference as well as a highly interesting group of papers on this important subject.

Developments in Refrigeration

HANDBOOK OF REFRIGERATING ENGINEERING, *3rd Edition. By W. R. Woolrich and Luis H. Bartlett. Published by D. Van Nostrand Co., Inc.,* 250 *Fourth Ave., New York City* 3, 1948. 730 *pages;* 5¼x7½ *in.; imitation leather. Price,* $8.50.

Rapid advances in the food freezing industry were among the principal reasons for completely revising this book for its third edition.

In addition to a full treatment of the whole field of low temperature engineering, the book has special chapters on refrigeration in the meat, poultry and dairy industries, along with chapters on cooler and freezer storage, quick freezing of foods, and the economics and design of locker storage.

Of the authors, the first named is dean of engineering, University of Texas, and the second is director, Engineering Experiment Station, Louisiana State University.

Government Publications

YEARBOOK OF FISHERIES STATISTICS 1947. *Food & Agriculture Organization of the United Nations. Available from International Documents Service, Columbia University Press, New York City* 27, *at* $4. This is a very comprehensive statistical statement made up in Washington from data furnished by the various member nations.

METHODS OF ARTIFICIAL RESPIRATION. *U. S. Coast Guard document CG* 139, *revision of June* 1948. *Price* 10c. Descriptive leaflet for industrial safety groups and plant training classes.

NUTRITIVE REQUIREMENTS AND FEED FORMULAS FOR CHICKENS. *By H. R. Bird. U. S. Department of Agriculture Circular No.* 788. *Price* 10c. Discusses (with analyses) various feed formulas and their dietary effect in chick feeding.

MARKETING POLICIES OF THE CALIFORNIA PRUNE AND APRICOT GROWERS ASSOCIATION. *By Harry C. Hensley. Farm Credit Administration Circular C-132. Price* 20c. Includes both merchandizing and a limited amount of handling and packaging information.

DAIRY AND POULTRY MARKET STATISTICS 1947. *Production & Marketing Administration document CS-28.* This is the typical annual summary of market statistics collected and compiled in the news division of Dairy & Poultry Marketing PMA, Department of Agriculture.

UNITED STATES GOVERNMENT MANUAL, 1948. *Price $1.* Describes functions and operations of Government departments and independent agencies.

ENAMELED CAST-IRON PLUMBING FIXTURES. *Bureau of Standards Commercial Standard CS77-48. Price 10c.* A recommended voluntary standard which includes specifications and tests which are applicable beyond the field of plumbing fixtures.

ANALYSIS OF HEDGING AND OTHER OPERATIONS IN GRAIN FUTURES. *By L. D. Howell. Bureau of Agricultural Economics leaflet T971. Price 20c.*

(Continued)

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Fig. 629

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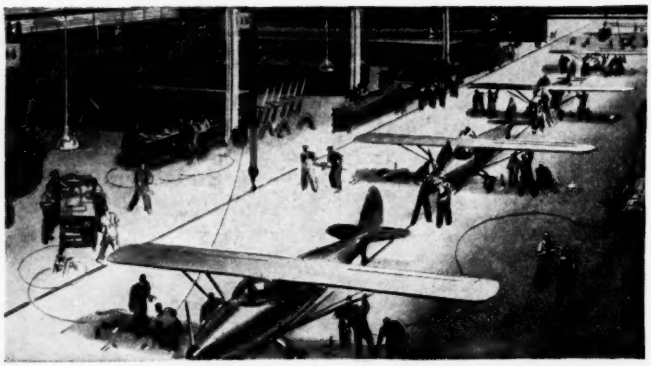

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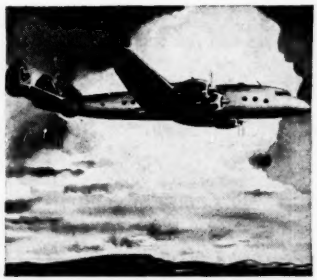

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THE EUROPEAN CORN BORER. *By W. A. Baker and W. G. Bradley. Department of Agriculture Farmers' Bulletin No. 1548. Price 15c.* Deals primarily with farm and field control methods.

INFORMATION ABOUT BEE CULTURE. *Bureau of Entomology leaflet E-276. Second Revision.* Includes bibliography and references to other sources of information.

COFFEE GRINDS. *National Bureau of Standards, Simplified Practice Recommendation R231-48. Price 10c.* Recommended standards for sizing of coffee for different named grinds.

BULGARIAN AND ACIDOPHILUS CULTURED MILKS. *By L. A. Burkey. Bureau of Dairy, Industry, BDIM-Inf-16. Revised. Processed.* Resume of present knowledge.

CHEMICAL CHANGES IN STORED GRAINS. *Bureau of Agricultural & Industrial Chemistry, ACE-191, Supplement 2. Mimeographed.* A selected and annotated bibliography.

RECOVERY AND UTILIZATION OF PULP FROM WHITE POTATO STARCH FACTORIES. *By Roderick K. Eskew, et al. Bureau of Agricultural & Industrial Chemistry, AIC-204. Processed. Available from Eastern Regional Research Laboratory, Philadelphia 18, Pa.* An analysis of economic prospects.

SOYBEAN STUDIES. *The staff of Northern Regional Research Laboratory, Peoria, Ill., has issued a series of brief mimeographed reports on its recent investigations.* These technical articles include: AIC-194, Fractionation of Soybean Oil by Liquid-Liquid Extraction; AIC-195, A Pilot Plant for Solvent Extraction Studies; AIC-196, Alcoholic Extraction of Oil From Soybeans; AIC-197, Food Uses for Soybean Protein; AIC-198, Edible Soybean Oil; AIC-199, Paints from Soybean Oil; AIC-200, Developments in Soybean Research at the Northern Regional Research Laboratory; and AIC-201, Composition and Its Effects on the Price of Soybeans and Soybean Oil.

The above recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the Bureau responsible for its issue.

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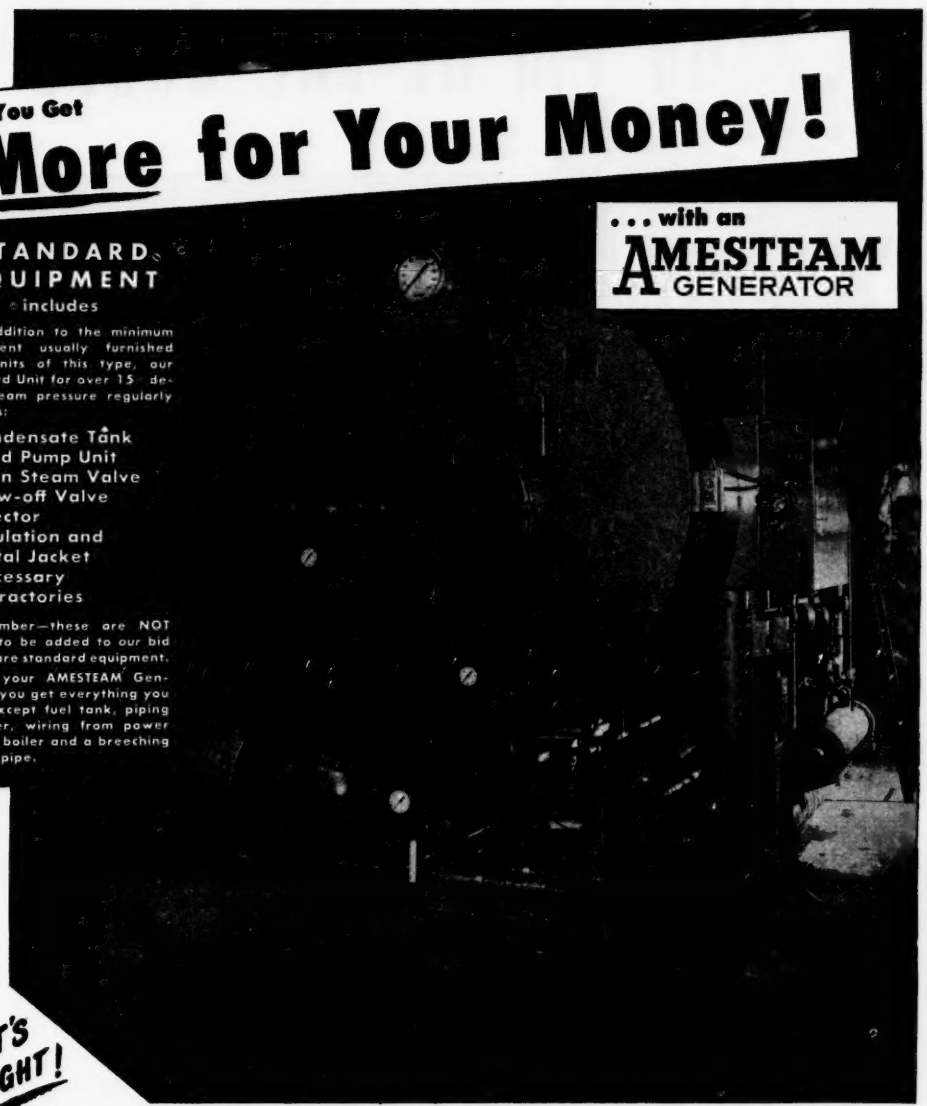

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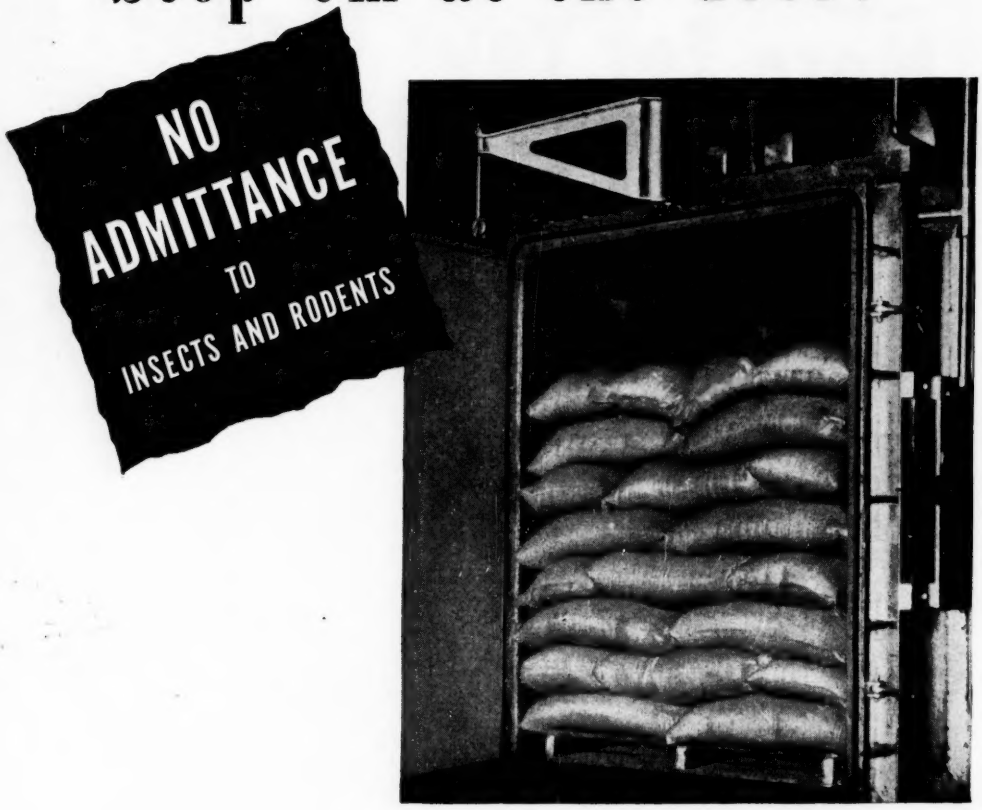

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Patents

Fluids Continuously Mixed During Passage Through Cylindrical Elongated Chamber Equipped With Heat Exchange Means and Eccentrically Positioned Beater Type of Agitator—Bruce De Haven Miller to Girdler Corp., Louisville, Ky. No. 2,448,042. Aug. 31, 1948.

Potato Slices Immersed in Hot Alkaline-Earth-Salt Solution for From 30 sec. to 10 min. to Control Color During Deep-Fat Frying—Alva R. Patton, Fort Collins, Colo. No. 2,448,152. Aug. 31, 1948.

Ground Sunflower Seed Extracted With Organic Fat Solvent and Subjected to High Vacuum at Low Temperature Preparatory to Extracting With Water to Obtain Vitamin and Other Water-Soluble Constituents—Ezra Levin, Champaign, Ill. No. 2,448,185. Aug. 31, 1948.

Glyceride Oxidative Deterioration Inhibited by Small Amount of 5-Pentadecyl Resorcinol—Harry M. Barnes, Summit, N. J., to General Foods Corp., Hoboken, N. J. No. 2,448,207. Aug. 31, 1948.

Materials Containing Essential Oils Stabilized Against Oxidative Deterioration by Addition of Small Amount of 5-Pentadecyl Resorcinol—Harry M. Barnes, Florham Park, N. J., to General Foods Corp., Hoboken, N. J. No. 2,448,208. Aug. 31, 1948.

Poultry Suspended by Releasable Shackle During Slaughtering and Dressing Operations—Elmer M. Davis, St. Paul, Minn. to Swift & Co., Chicago. No. 2,448,421. Aug. 31, 1948.

Non-Settling Chocolate-Flavored Beverage Made to Contain Suspending Agent Obtained as Water Soluble Extract of Iridescent Algae—Karl W. Karnopp, to Kalva Corp., Waukegan, Ill. No. 2,448,599. Sept. 7, 1948.

Nutrient for Microorganisms Obtained From Corn Steep Water—R. P. Meyers and M. L. Speck, Baltimore, Md., to National Dairy Research Laboratories, Inc., New York City. No. 2,448,680. Sep. 7, 1948.

Poultry Eviscerated by Pneumatic Suction—R. D. Trelease and C. H. Koonz, to Swift & Co., Chicago. No. 2,448,693. Sept. 7, 1948.

Rice Bran and Rice Polish Formed Into Aggregates by Addition of Water and Dried at About 140 Deg. F. in Inert Atmosphere Preliminary to Extraction With Vegetable Oil Solvent—Ataullah K. Ozai-Durrani, Stuttgart, Ark. No. 2,448,729. Sept. 7, 1948.

Milk Powder and Like Filled Into Containers Under Vacuum—D. D. Peebles, Hillsborough and G. P. Hensley, San Francisco, Calif., to Golden State Co., Ltd., San Francisco. No. 2,448,733. Sept. 7, 1948.

Confections Formed by Deposition Into Bottom-Vented Cup-Like Depressions on Exterior of Endless Belt Covered by Resilient Membrane to Form Interliner for Depressions and to Aid in Removal of Confections From Belt—Charles E. Faxton, Republic, Wash. No. 2,448,786. Sept. 7, 1948.

Molasses, Brown Sugar and Inorganic Nutrient Salts Used in Water Medium for Growing of Penicillin—J. W. Foster and L. E. McDaniel to Merck & Co., Inc., Rahway, N. J. No. 2,448,790. Sept. 7, 1948.

Cottonseed Meal Under Aerobic Submersion Used in Production of Penicillin by Growth of Penicillium notatum—J. W. Foster, New York City, and L. E. McDaniel, Rahway, N. J., to Merck & Co., Inc., Rahway, N. J. No. 2,448,791. Sept. 7, 1948.

Synthetic Vanilla Flavor Made to Consist of Vanillin, Caramel, Coumarin, Alcohol and Water—Charles Levy, Paterson, N. J. No. 2,448,896. Sept. 7, 1948.

Brewers Pitching Yeast Washed for Removal of Impurities During Agitation in Conical-Shaped Tank With Smallest Diameter at Bottom to Give Slower Rate of Yeast-Water Mixture Rotation at Surface and Permit Removal of Impurities by Continuous In-Flow of Water in Lower Portion of Tank and Discharge From Upper Portion—Albert M. Fischer, Chicago, with 40 percent to John E. Mistarz, Chicago. No. 2,448,927. Sept. 7, 1948.

Meat of Crabs and Other Crustaceans Canned With Mixture of Sodium Chloride, Disodium Phosphate and Citric Acid to Give Hydrogen-Ion Concentration Between 4.0 and 6.5—James J. Gauncheau to Southern Shell Fish Co., Inc., New Orleans. No. 2,448,970. Sept. 7, 1948.

Printed copies of patents are obtainable, at a cost of 25¢ each, directly from U. S. Patent Office, Washington, D. C.

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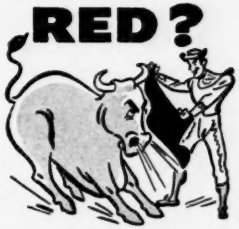
Bulls See RED?



Bulls are color-blind. Scientists have disproved the theory that they "see red." Famous matadors agree that when "El Toro" blows his top at sight of a waving red cape, it's the waving . . . not the red . . . that riles him.

COARSE SALT FOR SAUERKRAUT?

Another popular misconception is the belief among some makers of sauerkraut that they must use the very coarsest crystals of salt. Scientists *know* that light, bulky salt (such as Diamond Crystal's grain for the purpose) spreads more easily in the vat. This results in uniform salt distribution and much better control of sauerkraut fermentation.

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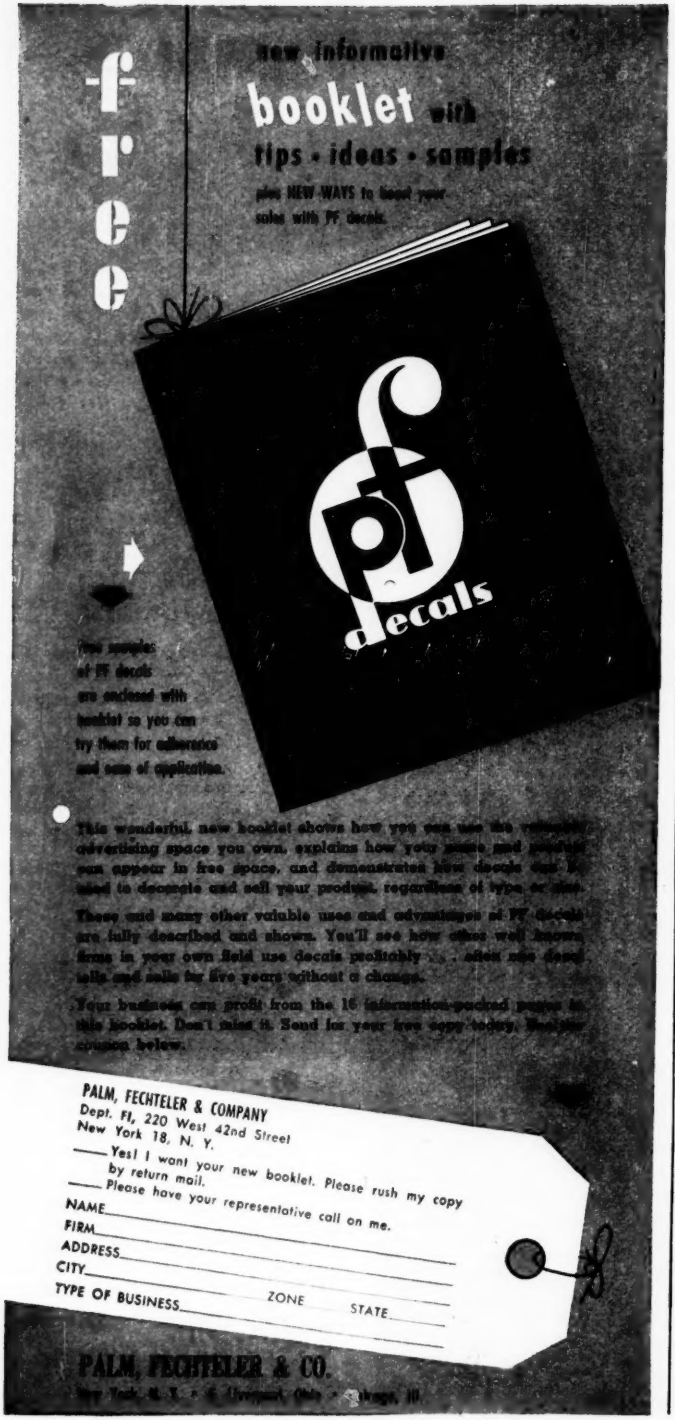
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Tests on Bacon

—Continued from page 80

test at 100 deg. F. Those in Table II show the necessity of a higher salt concentration, even though the moisture content is relatively low. Table III typifies bacon which has good keeping qualities and appearance combined with palatability.

The numbers of lipolytic or fat-splitting organisms were determined on Nile Blue sulfate plates. These organisms were a little slower in developing but usually died off faster than those found by the ordinary plate count method. The latter organisms increased quite rapidly in samples which spoiled, and then, these organisms gradually decreased.

By means of the curing procedure developed here, the normal appearance and palatability of freshly smoked bacon here retained for more than 10 months, in spite of storage under the extreme conditions (100 deg. F.).

Adaptation of this process to canning bacon on a commercial scale depends upon: (1) Degree of dehydration, (2) degree of cure, (3) adjustment of smoking and other procedures, and (4) adoption of a style and size of can which will meet the demands of the conditions to which the finished product will be subjected—not necessarily the extreme conditions (100 deg. F. for more than 10 months) under which these experimental packs were kept.

—End—

Dear Grandfather

—Continued from page 73

pany, though I've still managed to retain that title for myself.

These men in the sales department —and why I call that department my hobby I sometimes can't understand myself—busy themselves with our advertising agency, which conceives and prepares our messages to the public and does an excellent job of making advertising pay us dividends. They conduct research into new markets and rehabilitate old markets. They work with designers on new packages and new labels. And generally, in spite of their outstanding individualism, they accomplish the movement of our yearly packs—with the real assistance, of course, of our grand group of food brokers, located strategically over the country, who are in their markets punching day in and day out to accomplish sales for us and make a living for themselves.

Following in your footsteps, and in dad's, I have always been a great believer in the human touch in our re-

lationships with brokers and customers. But this sales department at the home office is piled high with mechanically prepared cards and reports, and their individual activities are just as cold as the mechanical brain they use for records.

No longer, grandfather, do we do business with Henry or George or Joe . . . for today we've reached the point wherein we do business with 2XB-421A or 17L421 which means, *maybe*, that our sales volume in Baltimore has increased or somebody's Aunt Mary passed away last night.

The thing that amazes me is that our brokers and our customers remain as loyal to us as they do, because in the eyes of our vice-president-in-charge-of-sales, the broker and the customer alike are treated like machines which can be turned on or off at his will. I hope to see the day when I find the slightest spark of human kindness injected into our sales department-broker-customer relationship.

Our manufacturing facilities, grandfather, are a thing to behold. We have new buildings, we have branch plants and we have new machinery in all installations. Yes, we just finished a war (we hope earnestly we have), and it was right profitable for us. But, getting back to those certain elements within our government, we weren't allowed to keep our profits. We replaced wearing machinery to as great an extent as possible under the laws; our net financial structure is just slightly more solid than prewar; in fact, because of our size and the complexity of our structure we no doubt could, but wouldn't want to, weather two bad crop years in a row.

You see, grandfather, there are so many nasty angles to business today, about any of which I could, and I suppose I should, worry constantly. We have taken good care of your business for you. We have really worked beyond the point of reasonable endurance. We will hand to our future generation a good-but-complex business.

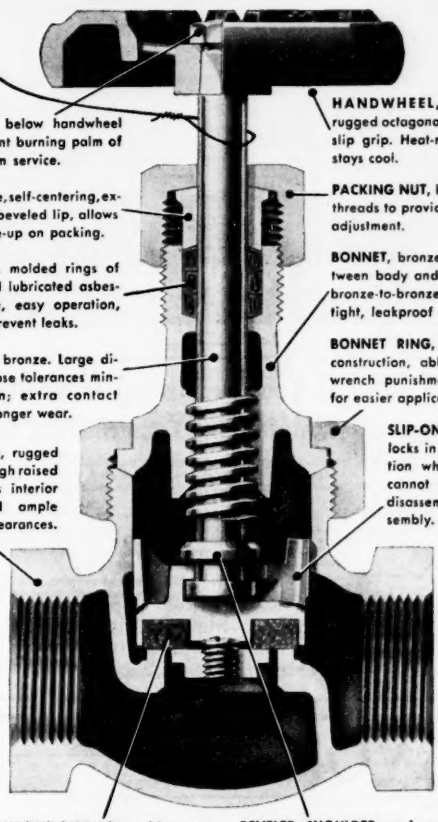
Can't Quit

But that future generation can't have this business until heaven removes me from the face of the earth —because of tax laws, which prohibit me from laying aside sufficient to "lay down my sword." I won't, grandfather —and this is the biggest disappointment of them all—be able to quit at a reasonable age and watch my son carry on, as you and dad did. I won't get the thrill of seeing his successes nor feel the satisfaction of helping him in commercial distresses.

That, grandfather, is why I am homesick for you, homesick for your simple but effective methods of doing

Here's WHAT makes this KENNEDY VALVE Better . . . . and WHY!

KENNEDY HEAVY BRONZE GLOBE VALVE (FIG. 89) recommended for services up to 150 pounds steam or 250 pounds water, oil, air or gas. ¼" to 3" sizes available.


WHEEL NUT, below handwheel level to prevent burning palm of hand on steam service.
HANDWHEEL, malleable iron, rugged octagonal shape, for non-slip grip. Heat-radiating design stays cool.
GLAND, bronze, self-centering, extra long with beveled lip, allows maximum take-up on packing.
PACKING NUT, bronze with long threads to provide extra packing adjustment.
PACKING, molded rings of graphited and lubricated asbestos give long, easy operation, tight seal to prevent leaks.
BONNET, bronze, with joint between body and bonnet making bronze-to-bronze true union for tight, leakproof construction.
STEM, special bronze. Large diameter and close tolerances minimize friction; extra contact threads give longer wear.
BONNET RING, bronze, heavy construction, able to withstand wrench punishment. Large flats for easier application of wrench.
SLIP-ON DISC HOLDER, locks in a definite position when wide open, cannot fall off during disassembly and reassembly.
BODY, bronze, rugged construction, high raised seat, generous interior passages and ample pipe thread clearances.
RENEWABLE COMPOSITION DISC, provides perfect seating; asbestos for steam service and special types for various services and temperatures.
BEVELED SHOULDER, makes tight joint with conical seat on underside of bonnet when valve is wide open, for repacking under pressure.

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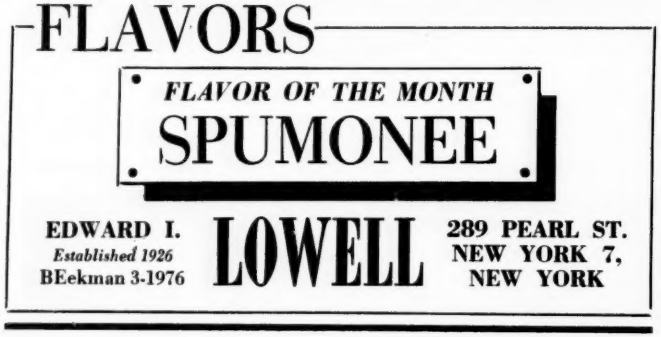
New York, 18, New York



business—home-spun methods, as they may be called by some people. That is why nostalgia must be my bride to the end of my natural days.

Proud of name but humble in spirit, I pray for rest upon your departed soul.

—Your Grandson

But I am not dismayed. Fact is, I've got to knock off now, pack my bag, take the afternoon train to New York, and leave early tomorrow on the non-stop flight to the Pacific Coast, where I'm considering buying another branch plant to add to my presently complicated business. Sincerely, though, I'd still like to do it grandfather's way.

— End —

Illinois Tech

—Continued from page 100

veloped and established by Wilson & Co., Inc., the first food processor in the Chicago area to adopt such a program with Illinois Institute of Technology. Part II will appear in the February issue.

The Research Program

In addition to the educational facilities being offered for undergraduate training in Food Engineering & Technology at Illinois Tech, plans are being made for graduate work and fellowships and for a broad fundamental research program. Extensive investigation is at present being made of personnel, facilities and scientific equipment that will permit evaluation of food processing technics on the broad basis of application to all types of food industries involving production, processing, packaging and distribution technics and practices. It is anticipated that all the conventional unit operations of food processing will be included along with the newer concepts of radiant energy applications.

Food Technology Council

To properly orient educational and research activities in its food technology program, Illinois Institute of Technology has established a Council composed of leading food technologists. This council will meet at least once a year to review critically the food engineering and technology program of the Institute and to consult with those staff members charged with its implementation. The first meeting was held on Oct. 1, 1948.

Roy C. Newton was elected chairman of the Food Technology Council, and Victor Conquest and Thomas L. Rector were elected vice-chairmen.

Since the first meeting of the Council, three working committees have been appointed by Chairman Newton for the purpose of advising the Council, and in turn the Illinois Institute of Technology, upon incidental matters of curriculum, food acceptability, and research development.

By its curriculum and through these committees and the Council, Illinois Institute of Technology aspires to serve the food industry to the maximum, both in education and research. By the caliber of its membership, Food Technology Council provides Illinois Tech with the best possible counsel for realizing its objectives in its Food Engineering & Technology Program.

— End —

Refrigeration Protects Peanuts

—Continued from page 71

low of 40 million pounds for August 1946.

Of the total of 1,600 million pounds of peanuts of this 1945 crop that was cleaned and shelled for edible use, about half were Spanish and the remainder almost equally divided between Virginias and Runners.

Peanuts that are stored in the shell are eaten from the hand after being roasted in the shell, while shelled peanuts are further processed before being consumed. For the past three years, an average of 17.3 percent of shelled nuts went into candies, 28.3 percent was salted, 49 percent went into peanut butter, and 2.2 percent was used in other products.

The three types of peanuts are grown in rather narrowly defined areas. The Virginia or Tennessee Red type is the very large peanut with deep red skin and often three or four seeds to the pod. These frequently are roasted in the shell and are grown largely in Virginia and North Carolina. Peanuts of the Spanish type are very small, have pink skin, and there are never more than two to the pod. They always are shelled before being stored and are used largely for peanut butter, salted peanuts and in candies. They are grown mostly in Georgia. The Carolina runner peanuts are intermediate in characteristics and uses and are grown in Alabama and westward.

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toward a NEW PEAK!

Boost impulse sales and brand identification, trade up your profits . . . with smart, modern, colorful, *distinctive* packaging by United!

Artists and designers at United use their skills to create a package for your product that will look attractive . . . will stand out among its competition on the grocer's shelf . . . will say "Buy me!" to Mrs. America.

Engineers and technicians at United work to create a package for your product that will provide sturdy, lasting protection . . . will save time and labor costs in setting up by hand . . . is precision-made and pre-tested for high-speed machine packing.

• • •

Our staff of experts will gladly show you—without obligation—how United cartons, custom-designed to your exact requirements, can increase your turnover and profits. If you already have a satisfactory package, ask us about our efficient manufacturing and service facilities. Write United today for information and samples.

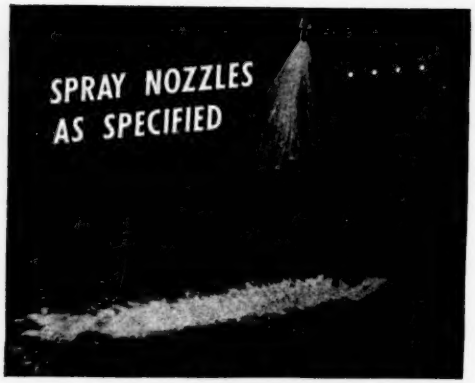
UNITED BOARD & CARTON Corporation

Folding Cartons and Paper Specialties • FROM PULP TO FINISHED PRODUCT

P. O. BOX 1318 • SYRACUSE, N. Y.

BOARD MILLS
Lockport, N. Y., Thomson, N. Y., Urbana, O.

CARTON PLANTS
Victory Mills, N. Y., Syracuse, N. Y., Brooklyn, N. Y., Cohoes, N. Y., Springfield, O.



When you check through Spraying Systems Spray Nozzle Catalog 22 (if you haven't a copy be sure to write for one) . . . you will find complete performance specifications for thousands of nozzle types and sizes. Like the precision-built VEEJET illustrated above, every Spraying Systems Spray Nozzle will provide a spray identical to its listed specification. As a result you can select nozzles to meet your established requirements exactly . . . to give maximum spraying efficiency and lower operating cost.

SPRAYING SYSTEMS CO.

Engineers and Manufacturers

4061 W. LAKE STREET • CHICAGO 24, ILLINOIS

WRITE FOR CATALOG 22

A New Improved
UNIVERSAL COLLOID AGENT

IT SUSPENDS . . .
IT GELS . . .
IT EMULSIFIES . . .
IT STABILIZES . . .
IT THICKENS . . .

We are now producing from Carragheen two new improved types of gelose. One of them should be the answer to your emulsifying, suspending, thickening or stabilizing problems.

KRIM-KO GEL is an all-purpose colloid-assistant. Properly used, it has been proved effective in many of the most exacting food, pharmaceutical and industrial applications.

CARRAGAR is an agar-type gelatin which forms tender, fruit-like gels over a wide pH range. It does not require acidulation to produce desired results.

Send for free liberal working samples for experimental use.

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—End—

GMA Convention

—Continued from page 111

leveling off, as is indicated from any number of economic angles. 2. Business spending—on plant, equipment, inventories—is very high, as high relatively as in 1929. And business spending is very sensitive to both favorable and unfavorable influences. 3. Record crops are bringing a drop in the price of new agricultural products. This is likely to be regarded as a forerunner of a fall in all prices. These factors would seem to preface at least a moderate recession.

The fact that the boom is leveling off, however, does not in itself indicate a recession. It may indicate the contrary, because it is evidence of the absence of speculative buying and commitments made on thin margins, which are likely to cause trouble if the outlook becomes unfavorable. Likewise, present business spending is largely an attempt to catch up in the replacement of obsolete equipment. It is not an attempt to anticipate growth in demand.

There are indications that consumers would be willing to spend more if the output of industry were larger. Add to these factors the great backlog of federal, state and municipal improvement spending—which can not be much longer delayed—and even a moderate recession seems unlikely.

The speaker further concluded that the Democratic victory diminishes the chance that a drop in business spending will produce an early recession. A fourth round of wage hikes, somewhat stiffer than they would have been under a Republican administration, and higher corporate taxes, will eventually force a drop in business spending. When the drop comes, however, it should be more than offset by the rise in government spending.

As for the tremendous increase in the demand for goods, Professor Slichter said the notion that private demand is chronically deficient is not substantiated by evidence. The course of prices during the past 100 years, the almost constant willingness of people to spend more than their in-

comes to get goods they want, and the huge scale on which the U. S. has imported labor from abroad, all indicate the contrary. Without giving up these old demands, the American people are now developing enormous new demands: Far greater public works; widespread and generous social services; a large defense establishment; and the most ambitious international foreign policy any nation has ever pursued.

Unfortunately, the new demands will not wait until industry has had time to make further large increases and improvements in plant and equipment. As a result, industry must resort to such devices as capital-savings through more rapid technological progress.

Nielson Research

Getting down to the more specific problems of food product sales, A. C. Nielsen, president, A. C. Nielsen Co., market research organization, disclosed that major advertised brands, audited by his company's food index service, had established an all-time high in high velocity turnover, in 1948.

These brands, he said, are now turning 54 percent faster than their less-well-advertised competitors. These brands have also maintained their popularity with the consumer, accounting for 43 percent of the total business in both 1947 and 1948. In 1942 they accounted for only 37 percent of the total business.

As an example of the sales importance of high quality, Mr. Nielsen cited a grocery brand, in a highly competitive field, that had increased its share-of-market by 129 percent since 1942. In that period, its tonnage sales increased 214 percent. For these gains, Mr. Nielsen credited patient laboratory work that developed a definitely superior product. Meanwhile, the producer of this brand's principal competitor—who had devoted his "research" activity to efforts to "prove" that his product was better—had cause to wonder why his business seemed to be pulling a deadweight.

Any list of outstanding changes in food buying habits, according to Nielsen, would include a high percentage of cases where success must be attributed to the element of convenience in the use of the product. One type of prepared food, used in baking, has increased its tonnage sales by 798 percent in the past 32 months. A "convenience" type of beverage has gained 197 percent in three years. This trend toward convenience items, the speaker said, shows unusual strength when the product is used for the care and feeding of infants.

The present dangerously low retail

(Continued)

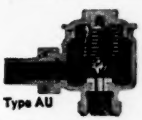
OLD EQUIPMENT WORN OUT?
look to LEE Kettles
FOR CORROSION-RESISTANT EQUIPMENT

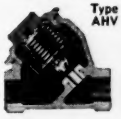
WRITE FOR NEW INFORMATIVE BULLETIN

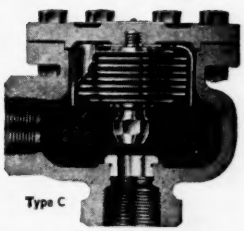
LEE METAL PRODUCTS CO. INC.
416 PINE STREET . . . PHILIPSBURG, PA.
ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

DOES DIRT PLUG YOUR STEAM TRAPS?

Larger, At-Bottom Valve Keeps Nicholson Traps Clean







Valve orifices of Nicholson steam traps are 2 to 6 times larger than in average traps, minimizing chances of plugging. And, valves being at the bottom, dirt drops out by gravity. This ability to self-clean is one of the features resulting in the unequalled discharge capacity of Nicholson traps. 5 types for every industrial application; size ¼" to 2"; press. to 225 lbs. Test trap gladly sent. BULLETIN 1047

HIGH-PRESSURE FLOATS — Stainless, monel, steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. 2-day delivery. BULLETIN 348.

W. H. NICHOLSON & CO.
193 OREGON STREET, WILKES-BARRE, PA.

Simplify valve selection with this LUNKENHEIMER "RENEWO" THREESOME...

The "RENEWO" Threesome is fully described in Circular No. 577, which also explains the economy feature of converting one type to another by simply changing seat and disc. A copy is yours for the asking . . . from your Lunkenheimer Distributor or from us direct.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

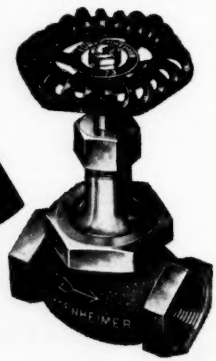
CINCINNATI 14, OHIO, U.S.A.

NEW YORK 13 · CHICAGO 6

BOSTON 10 · PHILADELPHIA 34

EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N.Y.

1 "REGULAR TYPE..."



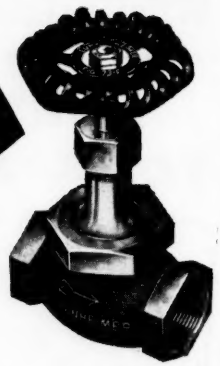
Nickel Alloy Seat and Disc

Fig. 73 200 lb. S.P.

Fig. 16 300 lb. S.P.

Regular "RENEWO": one of the most popular and widely used valves ever designed for general service. As the name clearly implies, all parts are renewable.

2 "P" TYPE...



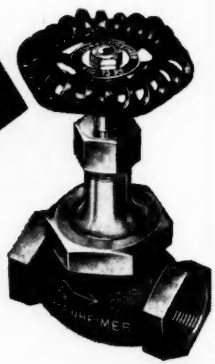
Nickel Alloy Seat and Disc

Fig. 73-P 200 lb. S.P.

Fig. 16-P 300 lb. S.P.

"P" (Plug Type) "RENEWO": for throttling, drain, drip water column blowdown and similar service. The "NSS" Nickel Alloy 330 Brinell seating material, developed and patented by Lunkenheimer, has exceptional wearing qualities and high corrosion resistance.

3 "PS" TYPE...



Nickel Alloy Seat and Disc

Fig. 73-PS 200 lb. S.P.

Fig. 16-PS 300 lb. S.P.

"PS" (Plug Type) "RENEWO": for maximum resistance to the effects of close throttling and other severe service, particularly where abrasive conditions are encountered. Equipped with stainless steel 500 Brinell seat and disc.

food stocks are a real danger to the food manufacturer, in that they place a severe strain on efforts to derive maximum sales results from each dollar spent in advertising. For 33 commodities surveyed by Nielsen, the average brand is out of stock in 16 percent of the stores that regularly carry the item. Prewar normals were 6 to 8 percent. Even the best stocked brands show an out-of-stock average of 8 percent, while the spottiest brands average 22 percent.

The long range problem of the food manufacturer, as seen by H. V. McNamara, president, National Tea Co., is to can and package more and more items that will give the housewife a complete meal with less cooking time and quicker service. As proof of this trend, he pointed to the rapid growth of the frozen food market in recent years. The speaker envisioned the grocery store of tomorrow as being 99 percent self-service. That means, he said, self service in meats, bakery goods, and produce, as well as in grocery and sundry items. He thought self-service of meats, both fresh and frozen, would move forward even more rapidly than did other items over the past ten years.

Base Pricing

William Simon, general council to the Senate Trade Policies Committee, pointed up the difficulties created by the Federal Trade Commission's action on basing point pricing in several industries, including beet sugar processing. He said that 15 percent of the sugar consumed in this country is beet sugar grown in the Rocky Mountain area. But only 3 percent of the population lives there. So beet sugar growers must ship their product to distant markets.

However, when the sugar is shipped east, it competes with Cuban markets. And when it goes west, it runs into Hawaiian cane sugar. The growers say they can not sell their normal production without absorbing freight and receiving varying mill net returns.

Congress must determine, Mr. Simon said, when, if ever, any seller is to be denied the right to compete for any business—in any market, with any competitor, under any pricing system, including the absorption of freight, and provided as he does not act pursuant to a conspiracy or agreement.

Dr. George R. Cowgill, professor of nutrition, Yale University, received the 14th annual GMA scientific award for his contribution to the science of nutrition, particularly for his research on the functional role of vitamin B_1, his success as a teacher of young biochemists, and his work for the *Journal of Nutrition*.

FI Outlook for '49

—Continued from page 78

tion of operating costs has become crucial. Even with high sales volume in 1948, profit margins were squeezed by the constant rise in labor costs. The rate paid for an hour's work in food processing has risen month by month during the past two years. In September, hourly earnings averaged 4c. higher than in January 1948, and 13c. higher than at the beginning of 1947. These figures probably do not reflect fully the increases granted under third round wage agreements. Freight rates also increased in 1948 and are still moving up.

As the result of spiraling costs, food manufacturers averaged only about 3c. profit per dollar of sales in 1948, compared with 3.5c. in 1947, and 4.6c. in 1939. So long as the total volume of sales is close to present levels, high dollar profits are possible, even on these narrow margins. But, as food prices continue down, the profit total will shrink, unless costs are kept under control.

Wage rates seem sure to keep going up in 1949. A fourth round of wage increases in the heavy industries now appears certain. Labor's political strength has been increased by the election. And profits in the basic industries have been relatively high. So further wage boosts seem unavoidable when these industries negotiate their 1949 contracts. Labor in other trades will then make similar demands.

The wage pattern for the food industries, however, need not follow closely the increases set by the automobile or steel companies. With food profit margins already declining, there is a good case for moderation of wage proposals. Moreover, it should be noted that food industry wages rose much less in 1948 than in 1947. Boosts in 1949 will probably be smaller yet.

Since wage increases in 1949 should turn out to be smaller than in 1948, there is a better chance to offset the rise by higher productivity per worker. The food industries have been going through a technological revolution, featured by the changeover from batch to continuous processing in many lines. Such new methods, together with better supervision and control, offer the best chance of increasing output per man-hour, and so holding operating costs in check.

It is for this reason that the food companies have scheduled large investments in plant and equipment for 1949. The McGraw-Hill survey of capital expenditures indicates that these investments may total over $400,000,000.

Put *accurate* Toledo Scales on the job every step of the way in your plant . . . for *closer control* of costs and quality! Toledos stop costly errors . . . save time by making each weighing operation quick and sure. For better control in weighing, checking, testing, counting, batching, force-measuring . . . let Toledo help you. Send for new bulletin No. 2020. Toledo Scale Company, Toledo 12, Ohio.

Send for this

TOLEDO

HEADQUARTERS FOR SCALES

One of a series of messages to help you increase your understanding of business paper advertising, and its effect on your job.

How much would NO advertising cost your company ?

SOME COMPANIES look upon advertising as an expense. When expenses have to be cut, the advertising budget looks like a good place to begin.

The only trouble with that theory is — it won't work.

Advertising can become expensive when you don't use *enough* of it. And "NO advertising" can cost far more than the "saving" it appears to create.

It's like failing to lubricate a piece of valuable machinery. You save the cost of the lubricant — but eventually there's a big repair bill to pay, not to mention your production losses while the machine is idle.

Advertising works something like a machine. It is the application of assembly-line methods to the five basic steps in the manufacture of a sale —

1. **Seeking out prospects**
2. **Arousing their interest**
3. **Creating a preference for your product**
4. **Making a specific proposal**
5. **Closing the order**

Can advertising perform all five of these steps? No, it usually takes a good salesman to handle the last two. But advertising *can* save much of his valuable time.

By mechanizing the *missionary job*, advertising becomes the most efficient method of manufacturing sales at a profit. Especially when it appears in the business press, where it is concentrated among your company's best prospects — *and no one else!*

FOOD INDUSTRIES

A McGRAW-HILL PUBLICATION
330 West 42nd Street
New York 18, N. Y.

is a member of The Associated Business Papers, who have published an interesting folder entitled, "How much does NO advertising cost?" We'll be glad to send you a copy. Also, if you'd like reprints of this advertisement (or the entire series) to show to others in your organization, just say the word.

PFIZER high standards of quality are reflected in many carefully-formulated food preparations used regularly by the American housewife. When she's baking at home, it's likely that the flour has been fortified with Pfizer Enrichment Concentrates supplied to the miller and containing the required thiamine, riboflavin, niacin and iron. The lard she uses may contain Pfizer Citric Acid to help prevent the development of rancidity.

When she spreads jams and jellies on the sandwiches she prepares she is probably using Pfizer Citric Acid and Pfizer Tartaric Acid. For these are the acidulants preferred by many manufacturers who place the greatest importance on uniformly high quality.

There are many ways in which we at Pfizer can help you serve the nutrition-wise housewife. Write us for details on these. Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y.; 211 E. North Water Street, Chicago 11, Illinois; 605 Third Street, San Francisco 7, Calif.

PFIZER

PFIZER QUALITY®

Manufacturing Chemists Since 1849

flavors

for EVERY Purpose

. . . and the BEST flavor for your PARTICULAR purpose!

Our **FREE** catalog will interest you. It describes a Special Service available to flavor users. Write us for Flavor Catalog No. F-481.

FRITZSCHE *Established* 1871 *Brothers, Inc.*

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia, Boston, Massachusetts, *Chicago, Illinois, Cincinnati, Ohio, Cleveland, Ohio, Dallas, Texas, Detroit, Michigan, *Los Angeles, California, Philadelphia, Pennsylvania, San Francisco, California, *St. Louis, Missouri, *Toronto, Canada and *Mexico, D. F. FACTORY: *Clifton, N. J.*

AN AMAZING LUBRICANT

LUBRIPLATE 130-AA

Protects Against Rust and Corrosion

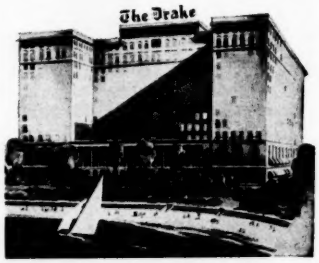
A super grease-type lubricant! A marvelous anti-seize compound and a real protector against rust and corrosion. From the standpoint of general utility and diversity of important uses, LUBRIPLATE 130-AA is unequalled. While it is ideal for the heaviest loads, this remarkable lubricant does not cause drag and actually conserves power. Write for a free copy of the LUBRIPLATE Service Hand Book.

LUBRIPLATE DIVISION
FISKE BROS. REFINING COMPANY
Newark 5, N. J. • Toledo 5, Ohio

DEALERS FROM COAST TO COAST - *See Your Local Classified Telephone Book*

Like Real

OLD FASHIONED SERVICE?



We have over 800 people to *serve* you!

Drake OWNER-MANAGEMENT assures you that this service will always be prompt, courteous. Our personnel strive to make your stay with us a delightful experience in warm hospitality, personal service.

EDWIN L. BRASHEARS
President
THOMAS BURNS
General Manager

the LOOP and the LAKE Meet at the

DRAKE
Chicago

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your job.*

How advertising puts money in your pocket

WHEN YOUR COMPANY invests in a new machine, they can figure almost to the penny what they'll get back in better production.

By reducing the manufacturing cost per unit, the new machine increases your company's chance to earn a profit. Your workers can earn more because they're *producing* more. That's the only way your company can put more money into everybody's pocket – including yours.

The same principle applies to advertising.

For advertising works just like a machine. By mechanizing part of the selling process, advertising reduces the cost of *manufacturing a sale.* And that, too, means more money in everybody's pocket – including yours.

What does it take to "manufacture" a sale? Usually, there are five basic steps involved:

1. **Seeking out prospects**
2. **Arousing their interest**
3. **Creating a preference for your product**
4. **Making a specific proposal**
5. **Closing the order**

Any good salesman could handle all five. But no salesman should *have* to – not when advertising can perform the first three for him, and do them so much more *economically.*

Especially is this true of advertising in the business press. Nowhere else does the machinery of advertising operate so efficiently. Nowhere else does it go so far toward reducing the cost of manufacturing a sale!

FOOD INDUSTRIES

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330 West 42nd Street
New York 18, N. Y.

is a member of The Associated Business Papers, who are sponsoring this campaign. If you'd like reprints of this advertisement, or the entire series, to pass along to others in your organization, we'll be glad to mail them to you.

For Fast Batch Grinding

Schutz O'Neill PULVERIZER

The Schutz-O'Neill Pulverizer with Receiver Box is a versatile unit, for rapid processing of any dry, grindable, non-gritty stock to desired fineness. Easy to clean or change for different materials. Accurate grinding control, with sharp separation and uniform fineness. Air force pulverizing plus air separation is the proven, automatic, dustless method.

Sizes from 12" up to 28", with capacities up to 2,000 lbs. per hour. Ask our engineers to analyze your requirements. No obligation.

Also makers of Schutz-O'Neill Gyrator Sifters, Roller Mills, Hammer Mills, Etc.

ESTABLISHED 1893 **SCHUTZ-O'NEILL CO.** DIVISION OF PARTEN MACHINERY CO.

PULVERIZERS · BREAKER MILLS · ROLLER MILLS · BURR MILLS · HAMMER MILLS

309 SIXTH AVENUE SOUTH • MINNEAPOLIS 15, MINNESOTA

PERMAG

FOR QUALITY PLUS — PERMAG — CLEANERS LEAD — TRADE MARK REG. U.S. PAT. OFF.

COMPOUNDS

for Quick Easy Cleaning in FOOD Plants

Used in

- Food Processing Plants
- the Dairying Industry
- Packing Establishments
- Bakeries
- Restaurants
- Hotels and general maintenance

There are PERMAC Compounds made specifically for cleaning purposes in the food industry.

There is a PERMAG Compound for your specific need.

Remove harmful contaminates—food residues—foreign soils—quickly and easily—and PERMAG rinses easily too.

PERMAG is through in action, safe, economical, an indispensable aid in metal equipment cleaning.

Our Technical Representative will give you more details and help you with any cleaning problem. Write us about them.

MAGNUSON PRODUCTS CORPORATION

Mfrs Specialized Cleaning Compounds for Industrial purposes

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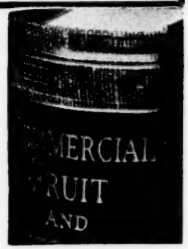
CHECK LIST of recent McGRAW-HILL BOOKS

1. COMMERCIAL FRUIT AND VEGETABLE PRODUCTS

By W. V. Cruess, Professor of Fruit Technology, University of California

906 pages, 6 x 9, illustrated, $8.50, Revised Third Edition



Here are the most efficient and modern methods in the processing and preserving of commercial fruits and vegetables. This guide helps you gain a clear understanding of the application of scientific principles to the manufacturing and preserving processes. It covers important advances in frozen-food preparation and handling, dehydration, packaging, spoilage of canned foods, canning, etc. A wealth of useful new material has been added on sanitation in food processing establishments; food packaging and packing; and mechanical handling and pretreatment of fruits and vegetables.

2. MILK AND MILK PROCESSING

By B. L. Herrington, Professor of Dairy Chemistry, Cornell University. 343 pages, 6 x 9½, scores of charts and tables, $3.75

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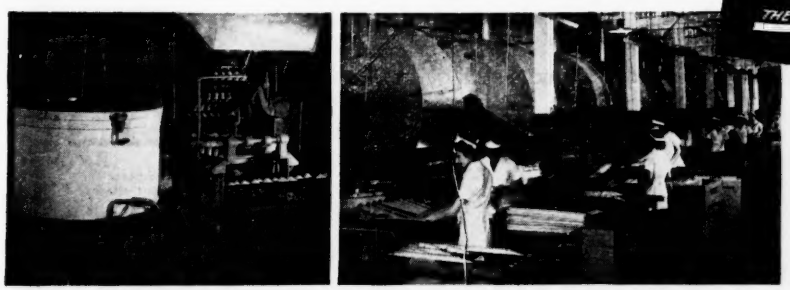

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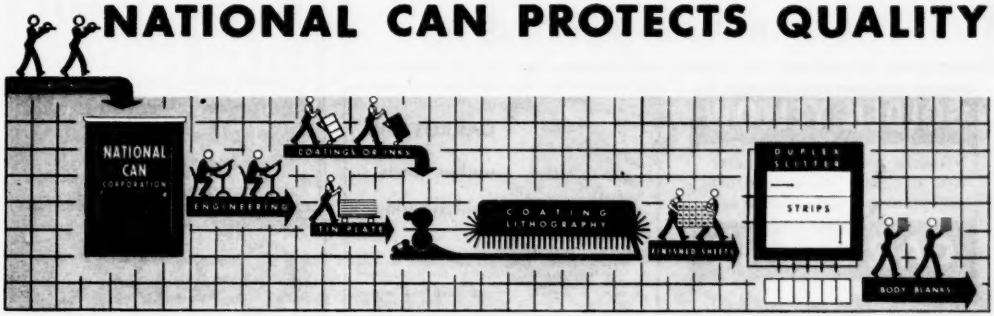

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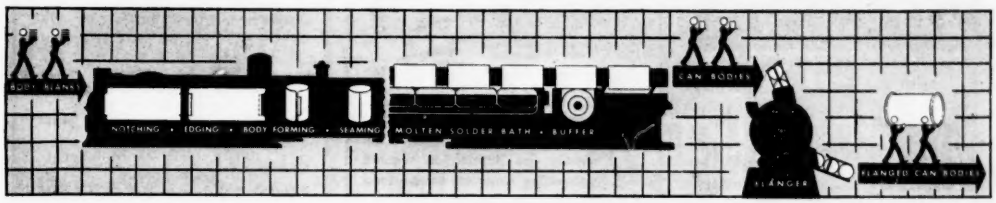

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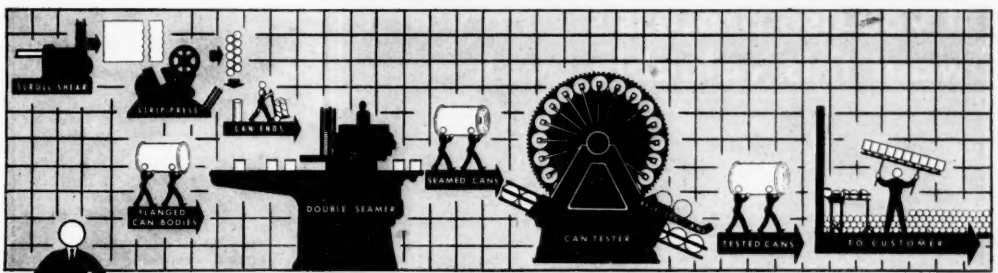

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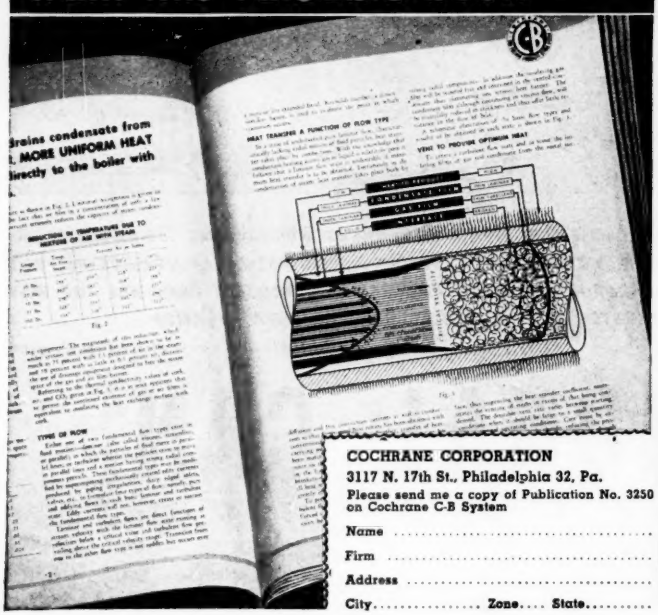
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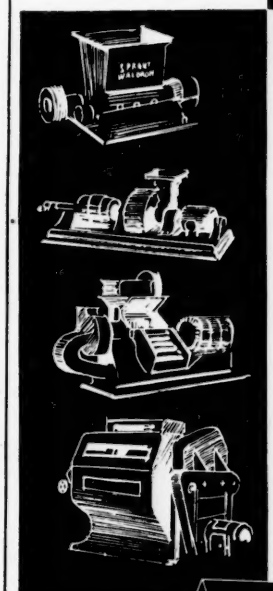

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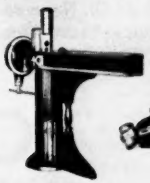

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FOOD CHEMIST; Ph.D., age 34, with assistant administrative and unusual practical industrial experience in research, control, production, market research, product development and medicine, is interested in permanent association with a hard working and progressive company. PW-7211, Food Industries.

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Excess of 30 years successful operation in Large Scale Cannery and for Frozen Food Industry. Experienced all phases of Management and Production, Finance Planning, Sales, Production and Organization Field to Can, Production Experience, all types fruits, vegetables, berries, chicken and other specialties, and cost conscious. "Can Produce Results". Excellent References. Now employed but seeking change. Go Anywhere.

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POSITIONS WANTED

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FOOD TECHNOLOGIST B.S. member IFT, ACS three years diversified experience production, process and product development, research, quality control. Excellent references. Desires production position N. Y. area. Available usual notice. PW 7349, Food Industries.

FOOD CHEMIST Ph.D., broad experience in research including chemical and bacteriological analysis of water. Best references. PW 7387, Food Industries.

FOOD TECHNOLOGIST, capable, many years practical experience. Development, quality control and production of preserves, jellies, allied products, condiments, soups, meat production, various specialties, actual operation of open kettles, vacuum pans, retorts, etc. Salary open. PW 7429, Food Industries.

RESEARCH AND Production Chemist, with long experience directing diversified phases of manufacture and development of confectionery, chocolate, gelating dessert, puddings, macaroni and other food products, desires position or responsibility to fully use his ability. PW 7471, Food Industries.

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Desires To Represent
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301-307 Powell Street Brooklyn 12, N. Y.

IN THE DISTRICT COURT OF THE UNITED STATES
SOUTHERN DISTRICT OF CALIFORNIA
CENTRAL DIVISION

In Bankruptcy No. 45,907-O'C.

In the Matter of GREAT NORTHERN BISCUIT COMPANY, *Bankrupt*

NOTICE OF BANKRUPT SALE

TRUSTEE'S SALE OF REAL ESTATE AND BUILDING, MACHINERY, SUPPLIES, TRUCKS, ETC., as a unit or separately, as directed by the Court. FULLY EQUIPPED, MODERN BISCUIT COMPANY AT LOS ANGELES, CALIF.

ON TUESDAY JANUARY 18, 1949, AT 10:00 A.M.

COURT ROOM OF HON. HUGH L. DICKSON, REFEREE IN BANKRUPTCY, 339 Federal Building, 312 N. Spring St., Los Angeles, Calif.

INVENTORY OF $1,041,402.08.

PRODUCTION: Sales value of $4,000,000.00 per annum operating one eight hour shift. Ample market for products in Coast area.

THE PLANT: New streamlined plant of reinforced concrete and steel construction, 600 feet long, 75 feet wide, free of posts or columns. Office extension 65 feet long by 50 feet wide.

Building equipped with sprinkler system throughout. 30 HP steam boiler, serviced by a railroad siding and platform on north side. Additional platform facilities to accommodate 60 delivery trucks.

GROUND AREA: 150 feet by 660 feet. Provides for future expansion to double the present floor area of 56,000 square feet.

EQUIPMENT: Fully equipped with two ultra modern stainless steel-lined steel band traveling ovens, 22 inches wide by 240 feet long. New 44 inch National Equipment marshmallow and chocolate enrobing unit. Other related equipment applicable to biscuit and cracker production. Most of equipment new in 1947 and 1948. All in satisfactory condition connected, ready for resumption of operations. Also fleet of nine trucks, and large supply of packaging and raw materials.

LOCATION: 10501 National Boulevard, Los Angeles, California.

INSPECTION: At above address. Inquire for Mr. Young. Phone: TExas 04671.

TERMS OF SALE:—A certified check for 25% of the amount bid must be deposited on award of bid, and balance on delivery of property immediately following sale. Right reserved to reject any and all bids and to continue or postpone the sale without assigning any reason therefor.

FOR FURTHER INFORMATION Apply to

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24" x 52" Vertical Retort*.....$50
27" Buffalo Chopper*.....75
10 Gal. Copper Tilting Kettle*.....35
30 Gal. Copper Stationary Kettle*....35
100 Gal. Groen 125# Stainless steel Kettle, with cover. New.....325
125 Gal. Heavy-duty Copper Mixing Kettle, retinned*.....250
Scott Automatic Scale ½ to 8 oz.*..175
Anderson ⅜" Dicer #2*.....75
425 Gal. Pfaudler Tank, agitated*....85
3¼ Copper Coil, 4 turns 75" O.D.*....95
Heat Exchanger, tinned copper double pipe, 14 tubes 12' long.....75
4 x 4 x 6 all-bronze Piston Pump*....50
Modern Bond Foot Crowner with chute*.....75
Reeves Transmission, Size 1*.....75
Steiner-Hobart #32 Meat Grinder, 1 HP.....75
5¾" Globe Meat Grinder, motor-base. 75
½ HP Master 280 rpm gear-head motor*.....45
5 HP 700 rpm G.E. Gearmotor*.....125
15 HP Westinghouse 1750 rpm motor*. 75
Geyer Single Piston Filler*.....175
2" DeLaval Rotary Bronze Pump*....55
1½" Bronze Turbine Pump, 1 HP motor*.....75
Burt #2 Caser, hand-powered.....75
Potdevin Carton Gluer, motor-dr. New.....165
Hawkins 192-can Exhauster #1 to #10*.....225
LaPorte Flat-wire Belting 24"-30"-36" wide. 100 ft. each. New. Sq. ft..0.50
World semi-automatic Labeler, m-dr.*.375
44 x 36 two-deck Gyrating Sifter*....125
180-can #1 A-B Cooler, square tank..50
130-can #2½ ditto.....50
¼ HP Lightin' Mixer, Model C.....25
100# Gardner Mixer & Sifter*.....100
#50 FMC Pulper, st. steel screen*....250

*All these items have been reconditioned

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ELECT MOTORS Single Phase. ¼- ⅓- ¾-1 HP
MECHANICAL COW Stainless Steel Homogenizer, complete with jacketed steam kettles, pre-cooler, extra parts. Ready to operate. Very reasonable.
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1 25-gallon tilting, 1 30-gallon, 2 50-gallon, 1 75-gallon, 1 200-gallon with agitator, all steam jacketed Copper Kettles. 2 Copper Fire Kettles 22" x 11". 1 U. S. Slicing Machine Model H. 2 J. H. Day Marshmallow Beaters, galvanized iron 14" x 25" x 17" without motors. 1 Fairbanks single beam platform scale. 1 glasslined tank 50" x 90" x 24". 1 galvanized iron tank 26" x 48" x 18" on angle iron stand. 1 steam jacketed glasslined round tank 36" x 36". 2 cypress tanks 33" x 38" x 34". 2 Model 6381-820 Minneapolis-Honeywell Temperature Recorders.

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3—65 gallon jacketed DOPP kettles—New, with hinged steel covers.
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1—12" x 30" Kent 3 roller water cooled mill.
1—16" x 40" Day 3 roller water cooled mill.
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1—Western Bear Cat shredder, size 2A
1—24" x 48" (42 cu. ft.) single ribbon and paddle mixers with A. C. motors.
1—Buffalo double drum dryer 32" D x 90" long.
1—20 gallon (5 blade paddle type) Stokes tilting type mixer.
1—J. H. Day 6 barrel "Hercules" tilting type mixer with A. C. motors.
2—24" x 24" Sperry C. I. open delivery plate and frame filter presses.
1—7 HP Kane high pressure fire tube gas fired boiler.
1—Norge "FASTEMP" model FH 55 AS room or space heater. For use with #1 or #2 oil.
1—Readco 100 gallon sigma blade heavy duty jacketed tilting type mixer.

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100 to 500 gal. Pfaudler Tanks, water jkt., agit.
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Model 135 Hormann Filter, 6 Ash. Pads.
50 to 1,000 gal. Homogenizers or Viscolizers.
Hoffman Mixer, 30"x60"x18".
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2" to 6" S.S., also Copper Vacuum Pans.
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Internal tube Milk Heater and Surface Coolers
5x5, 6x6, 6½x6½, 8x8, ammonia compressors
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5' x 33' Rotary Vacuum
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Buffalo Vacuum and J. P. Devine Vacuum Shelf, 40 x 42, 5, 6, 9 shelves

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1—#12 Sweetland 4" centers iron or copper leaves
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1—#5 Sweetland 2" centers, copper leaves
1—8 x 12 Oliver Acid Proof
2—8 x 12 Oliver all steel
3—8 x 10 Oliver Wood Stave
3—36" Sperry 60 plate cast iron, Recessed, center feed, open delivery, hydraulic closing
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MIXERS

1—W & P Size 12—Jacketed, 20 gallon working capacity
2—Baker Perkins size 17, Jacketed, 200 gallon working capacity
8—Baker Perkins size 15, Jacketed, 100 gallon working capacity
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1—W & P Size 16, unjacketed, 150 gallon working capacity
1—1000# J. H. Day Dry Powder, M.D.
1—1000 Stedman Drum Mixer, M.D.
1—3000# J. H. Day Dry Powder, M.D.

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1—60" Tolhurst Copper Basket, belt-driven, center slung.
2—48" Troy Steel Basket—V-belt M.D.
5—42" American Tool stainless steel, Direct Motor Driven
8—40" American Tool, Copper Basket, belt driven, in Battery, with Mixer

KETTLES

3—5500 gallon Steel, Copper Coils, closed
1—2000 gal. Steel Jacketed, open top, Agitated
4—1200 gal. Steel, Lead coils, lead lined, Closed
1—1200 gal. Aluminum, Jacketed, Closed
2—750 gal. Aluminum, Jacketed, closed, Agitated
1—700 gal. Steel Jacketed, open top, non-Agitated
1—550 gal. Steel Jacketed, open top, non-Agitated
1—500 gal. Aluminum, Jacketed, closed, Agitated
1—500 gal. Stainless Steel, jacketed, closed, agitated.
2—Pfaudler 350 gal. glass lined, jack., agit. kettles
1—200 gallon Steel Jacketed, open top, Agitated

MISCELLANEOUS

1—Ball & Jewell #1 Rotary Cutter
1—Eppenbach Size B Sanitary vertical Colloid Mill
1—#4TH Mikro Pulverizer
1—K.K. piston Visco Filler, #2
1—Standard Knapp #424 Auto. Glass and Sealer
1—Stokes #15 Auger Powder Filler
1—Mojonnier type 6'6" dia. Copper Vacuum Pan
1—Knapp Model 3B, Can Labeler
2—World Rotary Automatic Labelers
1—York 6" x 6" Refrig. Unit, 20 HP Motor.

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1—Aluminum Autoclave, 100 gal, jktd, agit.
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9—"Lightnin" Model "D" Agitators, 3 H.P.
2—3TH, 2TH Mikro Pulverizers and motors.
2—Day Ro-Ball S.S. Sifters, 40"x120".
1—Sweetland Filter #5, Stainless Steel.
1—Fitzpatrick S.S. Comminuter, 7½ H.P.
20—Powder Mixers 100 to 4000#.

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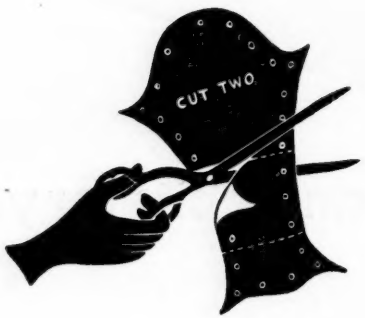

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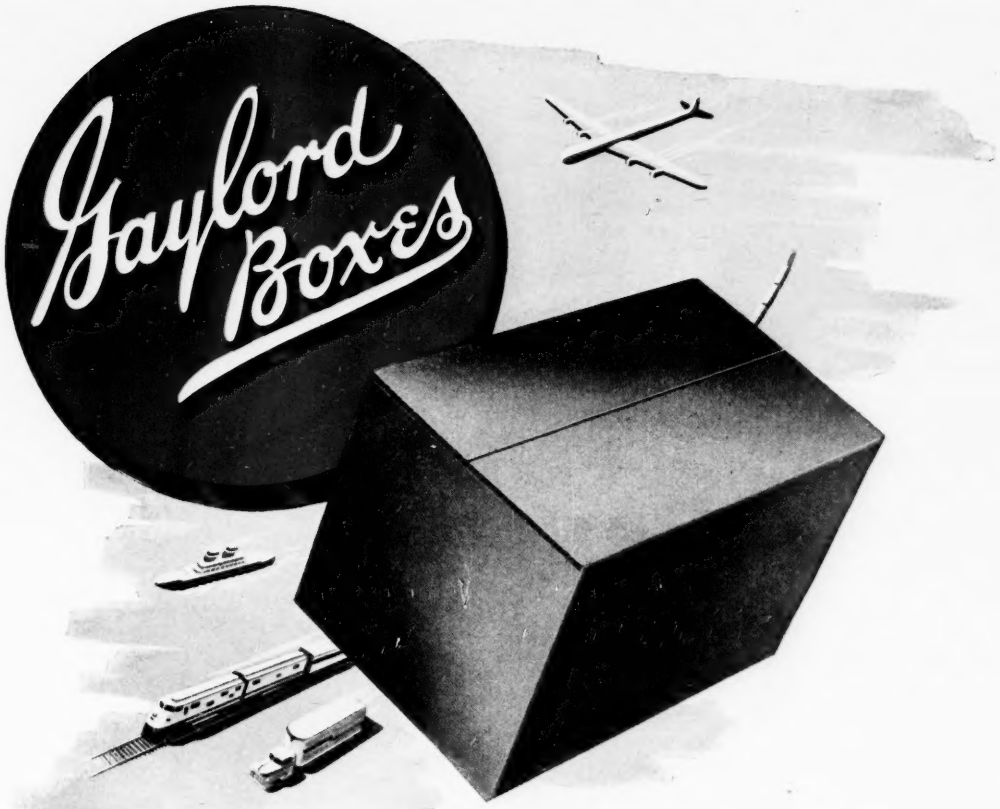

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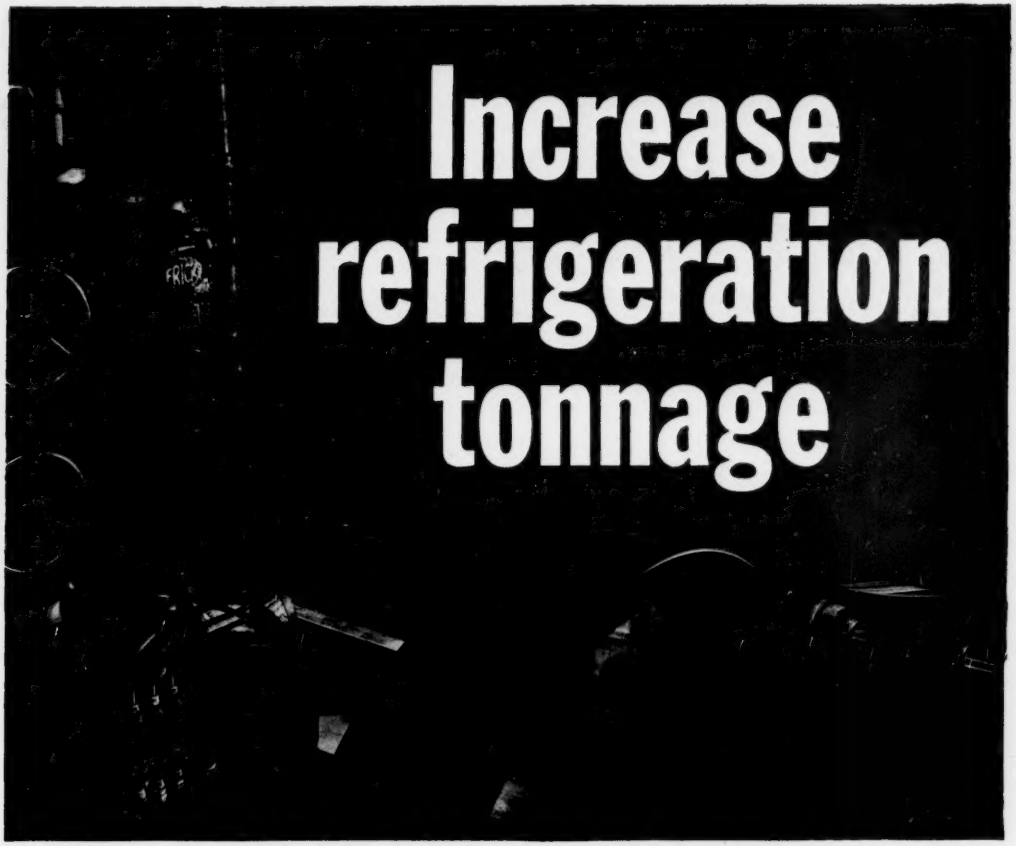

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